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BERRYESSA CREEK PROJECT,
SANTA CLARA COUNTY, CALIFORNIA
POST AUTHORIZATION CHANGE

GENERAL REEVALUATION STUDY
PROJECT MANAGEMENT PLAN

Prepared By:
U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

In Coordination With:
SANTA CLARA VALLEY WATER DISTRICT

APRIL 26, 2001

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SACRAMENTO DISTRICT CONCURRENCE PAGE

The undersigned concur with the Project Management Plan for the Berryessa Project, Santa Clara County, CA, General Reevaluation Report and acknowledge that it is a dynamic management document that may be updated as needed.

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BERRYESSA CREEK PROJECT
PROJECT MANAGEMENT PLAN FOR GENERAL REEVALUATION REPORT

PARTNERING AGENCIES CONCURRENCE PAGE

The undersigned concur with the Project Management Plan for the Berryessa Creek Project, Santa Clara County, CA, General Reevaluation Report and acknowledge that it is a dynamic management document that may be updated as needed.

NAME	TITLE	SIGNATURE/DATE
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GENERAL REEVALUATION PROJECT MANAGEMENT PLAN

TABLE OF CONTENTS

SACRAMENTO DISTRICT CONCURRENCE PAGE ii
PARTNERING AGENCIES CONCURRENCE PAGE iii
LIST OF TABLES vi
CHAPTER 1 - INTRODUCTION 9
    NEED FOR GENERAL REEVALUATION REPORT (GRR) 9
    PURPOSE AND SCOPE OF GRR PROJECT MANAGEMENT PLAN 9
    PROJECT BACKGROUND AND STATUS 10
        Authorization 10
        Project Location 10
        Prior Studies 10
        Prior Findings 10
        Local Cooperation Agreement 11
        GDM Authorized Plan 11
        Post Authorization Changes and Issues 11
        Legal Challenges 12
        Natural Resources Needs and Priorities 12
        Environmental Documentation 13
        Integrated Document 13
    GRR STUDY 13
        GRR Project Management Plan 13
        Purpose 13
        Objectives 14
        Alternatives 14
        Other alternatives considered but eliminated from further detailed analysis 15
CHAPTER 2 - MANAGEMENT OF STUDY 15
    GENERAL 16
        Project Executive Committee 16
        Project Management Team 16
        Project Review Board (PRB) 16
    PROJECT MANAGEMENT TOOLS 19
        Budgetary Documents 19
        Monthly Status Report 19
        Schedule and Cost Change Request 19
        Scopes of Service/ Funded Work Items (FWI) 19
        Quality Control/Assurance Plan 20

CHAPTER 3 – SCOPE OF SERVICES AND GRR COST ESTIMATE 21
    OVERVIEW OF GRR STUDY EFFORT 21
    STUDY COSTS 23
        CODE OF ACCOUNTS 23
    SCOPE OF SERVICES (SOS) 24
        RA Engineering Appendix / Report 25
        RB Economic Analysis/Report 33
        RC Real Estate Studies 36

RD Environmental Studies/Report 40
RE Fish and Wildlife Coordination Act (FWCA) Activities 45
RF HTRW Studies 46
RG Cultural Resources Report 48
RH Cost Estimates 49
RI Public Involvement 50
RJ Plan Formulation and Evaluation Reports 52
RK Report Documentation & Preparation 53
RP GRR/EIS/EIR Planning and Project Management Coordination 54
RNA Independent Technical Review 57
RL Washington Level Review/Headquarters Compliance Documents 58

CHAPTER 4 - MILESTONES & SCHEDULE 61
DESCRIPTION OF MILESTONES 61
Initiate GRR/EIS/EIR Study 61
Alternative Formulation Briefing 61
Draft GRR/EIS/EIR to SPD 61
Final GRR/EIS/EIS 61
Division Engineer Notice 61
DESCRIPTION OF SCHEDULE 61

CHAPTER 5 - QUALITY CONTROL PLAN 62
REFERENCES 62
OBJECTIVE 62
QUALITY GUIDELINES 62
LEVEL OF DETAIL OF REVIEW 62
PROJECT MANAGEMENT TEAM 63
SEAMLESS REVIEW PROCESS 63
PRODUCTS BY CONTRACTORS 63
PRODUCTS FOR REVIEW AND REVIEW SCHEDULE 63
KNOWN POLICY ISSUES: 64
MAJOR GRR/EIS/EIR & TECHNICAL ISSUES 64
CONFLICT RESOLUTION PROCEDURES 65
CONSISTENCY REVIEW BETWEEN THE ENVIRONMENTAL AND ENGINEERING DOCUMENTS 65
INDEPENDENT TECHNICAL REVIEW TEAM 65

LIST OF TABLES

Table 2.2 Project Team Members ... 18
Table 3.1 Summary Cost Estimate ... 23
Table 3.2 Sample Code of Accounts/Work Breakdown Structure Administrative and Accounting System ... 24
Table 3.3 RA Engineering Analysis Report ... 33
Table 3.4 RB Economic Analysis/Report Cost Summary ... 36
Table 3.5 RC Real Estate Studies Cost Estimate ... 40
Table 3.6 RD Environment Studies/Report ... 45
Table 3.7 RE Draft and Final FWCA Reports ... 46
Table 3.8 RF HTRW Studies ... 48
Table 3.9 RG Cultural Resources Report ... 49
Table 3.10 RH Engineering Analysis Report ... 50
Table 3.11 RI Public Involvement ... 52
Table 3.12 RJ Plan Formulation and Evaluation Reports ... 53
Table 3.13 RK Report Documentation and Preparation ... 54
Table 3.14 RP GRR/EIS/EIR Planning and Project Management Coordination ... 57
Table 3.15 RNA Independent Technical Review ... 58
Table 3.16 RL Washington Level Review ... 58
Table 3.17 Cost Estimate of Work Summary (in $K) ... 60
Table 5.1 Independent Technical Review Team ... 66

LIST OF APPENDICES

A. TECHNICAL REQUIREMENTS
B. HYDRAULIC ENGINEERING MANAGEMENT PLAN (HEMP)
C. COMPLETE PROJECT SCHEDULE
D. OUTLINE FOR GENERAL REEVALUATION REPORT/ SUPPLEMENT ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT
E. CONTRACTOR QUALITY CONTROL PLANS
F. CONTRACTOR SCOPES OF WORK

ACRONYMS

A-E	Architectural and Engineering
AFB	Alternative Formulation Briefing
CEQA	California Environmental Quality Act
DM	Design Memorandum
EA	Environmental Assessment
EC	Engineering Circular
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Engineering Manual
ER	Engineering Regulation
ETM	Engineering Technical Manager
FRC	Feasibility Review Conference
GIS	Geographic Information Systems
H & H	Hydrology and Hydraulics
HEP	Habitat Evaluation Procedures
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HTRW	Hazardous, Toxic, and Radioactive Waste
IRC	Issue Resolution Conference
IS	Initial Statement
IPR	In-Progress Review
LERRDs	Lands, Easements, Right-of-ways, Relocations, and Disposal Areas
M-CACES	Micro-Computer Aided Cost Estimate System
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
OA	Other Agency
OC	Other Corps
OE	Other Expense
PED	Pre-construction Engineering and Design
PES	Project Executive Summary
PGM	Project Guidance Memorandum
PMP	Project Management Plan
PMT	Project Management Team
PRB	Project Review Board
QCP	Quality Control Plan
RCSA	Reevaluation Cost Sharing Agreement
RPMBP	Regional Project Management Business Process
SACCR	Schedule and Cost Change Request
SCVWD	Santa Clara Valley Water District
SPD	South Pacific Division
TFFS	Technical Fact Finding Subcommittee
TRT	Technical Review Team
UPRR	Union Pacific Railroad
USFWS	U.S. Fish and Wildlife Service
WBS	Work Breakdown Structure
WRDA	Water Resources Development Act

CHAPTER 1 - INTRODUCTION

NEED FOR GENERAL REEVALUATION REPORT (GRR)

Since the draft Berryessa Creek Project General Design Memorandum (GDM) was completed in December 1993, the proposed plan met with disfavor in the local community due primarily to the concrete channel features that were recommended. A Project Study Plan (PSP) was developed in July 1996 to identify a more locally-acceptable plan and subsequently complete a GDM, but all planning and engineering work ceased in October 1996 due to unresolved issues on the direction and funding of the study. Since flooding is still a significant problem along Berryessa Creek, the Santa Clara Valley Water District (SCVWD) has requested that the Corps re-evaluate flood protection alternatives in order to find a more environmentally-acceptable solution.

The primary objective of the GRR, then, is to assess the feasibility of modifying the authorized project to control sedimentation and flooding in a manner that is complete, effective, efficient, environmentally-compliant, and acceptable to the non-Federal Partner and community. Within the primary objective of the GRR, the specific objective is to identify a complete plan that will yield an economically justified project that accomplishes the following: (1) reduces flood damages to populated areas, (2) reduces sedimentation and maintenance requirements, (3) provides access and recreation to the public, as feasible, (4) avoids and minimizes effects to riparian and aquatic habitat, (5) provides appropriate aquatic and riparian habitat restoration and fish passage, (6) maintains or reduces water temperature, (7) complies with resource agencies' authorities, and (8) fully coordinates with other Federal state, and local agencies.

PURPOSE AND SCOPE OF GRR PROJECT MANAGEMENT PLAN

The purpose of this Project Management Plan (PMP) is to guide the project study team of the General Reevaluation Report (GRR) and study process, and to ensure that the work required for the study and report has been identified and coordinated. The Project Management Plan is the basis for defining the scope of study, task requirements and responsibilities, schedule, and costs among the Corps of Engineers (Corps), non-Federal Partner and contractors, and can be used to justify any necessary future negotiated modifications. It provides a common understanding between the Corps' Sacramento District (CESPK), South Pacific Division (CESPD), and Headquarters (HQUSACE), as well as the non-Federal Partner, the Santa Clara Valley Water District (SCVWD).

The Project Management Plan was developed in consideration of available existing reports, data bases, and project management procedures consistent with the requirements of the Corps' Engineer Regulations (ER) 1105-2-100, ER 5-1-11, CESPD-ET-P (dated 30 April 1999, Guidance for Post-Authorization Decision Documents) and CESPD-R-1110-1-8. Study team members and reviewers will use this Project Management Plan and any updates to manage tasks and resources most efficiently. Because the planning process is dynamic, the Project Management Plan tasks, scope, and schedule may change. Such changes are subject to the approval of the Executive Committee and amendment(s) to this Project Management Plan.

PROJECT BACKGROUND AND STATUS

Authorization

The Berryessa Creek Project (Project) was authorized by the Water Resources Development Act (WRDA) of 1990 [Public Law 101-640, Section 101(a)(5)] following transmittal of the Chief of Engineer's Report in February, 1989.

Project Location

The Berryessa Creek watershed is located in Santa Clara County, California, south of San Francisco Bay, as shown in Map 1, "Regional Map." Berryessa Creek is a tributary to the Coyote Creek system, which flows into the southernmost end of San Francisco Bay. The Berryessa Creek watershed is about 22 square miles in size and drains portions of the Diablo Range on the east side of the Santa Clara Valley. The highest elevation in the watershed is approximately 2000 feet MSL. The Creek flows west out of the Diablo Range and into the residential neighborhoods of San Jose and Milpitas, finally turning north through industrial portions of Milpitas before joining Lower Penitencia Creek.

The area of focus for this study is approximately 4.5 miles in length, from about 600 feet upstream of Old Piedmont Road down to Calaveras Boulevard (Hwy. 237), as shown in Map 2, "Project Location Map." The existing creek channel varies between a natural and semi-natural channel upstream of Cropley Avenue, with a concrete-lined section from Cropley Avenue downstream to Highway 680. Downstream of Highway 680, Berryessa Creek is a soft-bottom, concrete lined bank trapezoidal channel.

Prior Studies

The Corps of Engineers began studying flood protection opportunities in 1948 for the *Guadalupe River and Adjacent Systems* study. Studies on various drainages within this study authority were completed in 1968, 1976, 1980, 1983, and 1988. The Feasibility Report on Coyote and Berryessa Creeks was completed in 1987 and revised in April, 1988. It recommended the implementation of the following measures for the Berryessa Creek element: a sedimentation basin, improvements to an existing debris basin, concrete-lined trapezoidal channels, an offset levee and berm system, and appropriate fish and wildlife mitigation. The project would provide 100-year flood protection to areas of San Jose and Milpitas.

The Report of the Chief of Engineers was transmitted by the Secretary of the Army to Congress in December, 1989, and the Draft General Design Memorandum (GDM) was completed in 1993.

Prior Findings

- The study area is at continuing high risk to flooding and serious sediment deposition problems.
- The existing natural resources along Berryessa Creek are highly degraded as a result of channelization, concrete lining, and adjacent development.
- There is strong support by Federal, state and local agencies and public for providing

flood protection, environmental protection, and recreation along Berryessa Creek, in San Jose and Milpitas.

- The SCVWD is strongly interested and supportive of solutions to sediment deposition and habitat problems in the study area.

Local Cooperation Agreement

A Re-evaluation Cost Sharing Agreement (RCSA) would be executed for flood protection and recreation by the non-Federal Partner, the Santa Clara Valley Water District (SCVWD) and the Federal Government represented by the U.S. Army Corps of Engineers. The RCSA would be reviewed at the Washington level prior to implementation of the GRR if it differs from boilerplate Feasibility Cost Sharing Agreements (FCSAs).

GDM Authorized Plan

The GDM Recommended Plan begins 600 feet upstream of Old Piedmont Road, with a 500 x 160 foot reinforced concrete-walled sedimentation basin. This basin would transition into a new box culvert under Old Piedmont Road. From Old Piedmont Road to Piedmont Road/Cropley Avenue the channel would be a trapezoidal concrete-lined channel with a bottom width of 8 feet and 2:1 (H: V) bank slopes. The existing 400-foot-long box culvert under the Piedmont Road/Cropley Avenue intersection would be retained. A service road along the east bank would be maintained, and the riparian vegetation along the west bank would be retained as much as possible. Downstream of Cropley Avenue, an existing debris basin would be enlarged and lined with concrete walls to function as a secondary sedimentation basin. Throughout the greenbelt area, the existing channel would be retained as much as possible and the existing berms and levees would be raised to contain the design flood. At the downstream end of the greenbelt (approximately 600 ft upstream of Morrill Avenue), a transition area would lead into another trapezoidal concrete-lined channel downstream to Cropley Avenue, until it joins with the existing concrete lined channel. Where the existing concrete-lined channel ends (just upstream of Highway 680), this project would construct a trapezoidal concrete-lined channel all the way downstream to Calaveras Boulevard where a rock transition would be placed to transition flows from the concrete channel into the existing earth-bottomed channel. Mitigation plantings of riparian vegetation at a rate of 2 plants per each plant removed were proposed to be planted in Berryessa Creek Park and the greenbelt. Landscape screening plantings would also be provided at all street crossings to minimize the adverse aesthetic effect of the concrete lined channel.

Post Authorization Changes and Issues

The authorized Berryessa Creek project has not been constructed. Subsequent discussions with the Santa Clara Valley Water District and interested environmental groups and community members showed that the project did not have wide support in the community. Issues included the likely damages to the riparian zone from a trapezoidal concrete channel and loss of aesthetics, recreation and natural resources. A revised draft GDM was prepared in 1993, with some modifications to the authorized project. In several areas, the trapezoidal concrete lined channel would be replaced with a rectangular concrete lined channel, to minimize removal of the riparian zone. The dimensions of the sediment basins were also revised. Concern about channel degradation in the greenbelt caused the addition of bed stabilizers (riprap weirs) in several locations in the greenbelt. However, this revised project also met with opposition from the community and was subsequently not considered for construction pending the findings of additional feasibility-level reevaluation studies.

Downstream of the proposed Corps project, the Santa Clara Valley Water District is concurrently investigating the need for improved flood protection facilities (existing levees/floodwalls) for an approximately 8,800-foot reach down to Lower Penitencia Creek. The existing levees and floodwalls in this area are believed to be unstable and subject to catastrophic failure. Further analysis will determine if there is a need to upgrade these levees and floodwalls. The existing levees/floodwalls provide 100-year protection. The SCVWD will proceed with their study and possible modification of the levees and floodwalls regardless of what happens with the Corps project.

In addition, several species have been listed under the Endangered Species Act since the Final EIS was completed in 1988. Listed species most likely to occur in the project area include Central California coastal steelhead trout (threatened), California red-legged frog (threatened), and bald eagle (threatened). Berryessa Creek is included in the critical habitat designation for steelhead, and likely provides critical habitat for red-legged frogs. Species which occur downstream in estuary waters of Coyote Creek and Lower Penitencia Creek could also be affected by project activities. Consultation with U.S. Fish and Wildlife Service and the National Marine Fisheries Service would now be required for this project.

Legal Challenges

There are no legal challenges anticipated for this study. It will be conducted in compliance with applicable environmental, local, state and Federal laws and guidance. Residents in the area are in support of a flood protection plan.

Natural Resources Needs and Priorities

The focus of the project is now on providing flood and sediment protection, while at the same time avoiding environmental impacts and providing appropriate habitat restoration to assist in the recovery of listed endangered species. For this reason, new alternatives are being developed that would avoid or minimize the use of concrete-lined channels and focus instead on sediment control and riparian restoration in the watershed project area.

Coordination with the U.S Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) took place in September/October, 2000, which resulted in several resource needs. These include (1) maintaining in-channel wetland habitat, (2) developing fish passage opportunities, (3) increased riparian restoration opportunities, and (4) water quality improvement.

As part of the GRR process, the Sacramento District will develop several environmental reports and documents which would support the project design modifications. These reports and documents include an Aquatic Habitat Survey, a Steelhead Survey, a Water and Sediment Quality Report, a Red-Legged Frog Survey, a Mitigation and Monitoring Plan, Biological Assessments for NMFS and USFWS, a draft and final EIS/EIR, a 404(b)(1) alternatives analysis, and a 401 water quality certification. The reports and documents cannot be finalized until the completion of (1) hydraulic modeling study, (2) the engineering analysis report, and (3) design and sediment transport studies.

Environmental Documentation

It has not yet been determined whether an EIS or an EA/FONSI will be prepared for this project. At this time, preparation of an EIS is anticipated and incorporated in the scope of work, but the intent is to select an alternative that will avoid significant adverse environmental impacts and negate the need for an EIS, in which case an EA/FONSI may be prepared. In either case, a supplemental document will not be prepared, but rather a new complete NEPA/CEQA document since the selected plan will likely be significantly different from the previously authorized plan.

Integrated Document

[this section is struck-out due to potential unresolved issue of an integrated versus a stand-alone EIS/EIR. Previous language is left in this Draft version in case the intent is to integrate the EIS/EIR as previously planned.]

GRR STUDY

GRR Project Management Plan

The GRR program will be conducted consistent with the Corps' General Investigations guidance for flood control and ecosystem restoration authorities, *Guidance for Conducting Civil Works Planning Studies* (ER 1105-2-100) and *Ecosystem Restoration in the Civil Works Program* (EC 1105-2-210), and *Procedures for Implementing the National Environmental Policy Act* (NEPA; ER 200-2-2). The primary study focus is on determining the feasibility of providing flood protection along the study reach in conjunction with, whenever possible, restoring the degraded ecosystem resources, structure, function, and dynamics to a more natural conditions. Specific study tasks are described in Chapter 3 of this Project Management Plan. The study program will accomplish the following.

- Develop new alternatives not considered in previous documents.
- Analyze alternative plans and select a plan to recommend for implementation.
- Include an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) in compliance with NEPA and The California Environmental Quality Act (CEQA)
- Develop feasibility level detailed design and MCACES cost estimate for the recommended plan as a basis for preparing plans and specifications.

Purpose

The purpose of this GRR study is to formulate and assess a modified recommended plan for the Berryessa Creek project area, from a few hundred feet upstream of Old Piedmont Road downstream to Calaveras Boulevard. The alternatives to be formulated address the flood protection and environmental elements of the authorized project and provide a basis from which to select a recommended plan. In conjunction with this study, supplemental environmental documentation is being developed.

Objectives

The specific objective of the GRR study is to identify a complete plan that will yield an economically justified project that accomplishes the following elements as previously stated earlier in the Chapter: (1) reduces flood damages to populated areas, (2) reduces sedimentation and maintenance requirements, (3) provides access and recreation to the public, as feasible, (4) avoids and minimizes effects to riparian and aquatic habitat, (5) provides appropriate aquatic and riparian habitat restoration and fish passage, (6) maintains or reduces water temperature, (7) complies with resource agencies' authorities, and (8) fully coordinates with other Federal state, and local agencies.

Alternatives

There are at least three (3) primary alternatives that have been identified to be studied as part of the reevaluation effort.

(1) "No Action" Alternative. This alternative consists of the Federal government taking no action to implement a project. Current conditions would remain "as is" and the future condition would likely degrade. Flooding would continue to worsen as sedimentation increases in the channel since the Water District has experienced difficulties in obtaining permits to remove sediment. The existing degraded habitat conditions would continue with limited improvements expected.

(2) Sediment and Flood Storage Alternative. This alternative would create one or more off-line sediment and flood storage basins to reduce the sediment transport and flood peaks to an acceptable level. Some existing levees would likely be raised and upgraded and additional levees may need to be constructed. The riparian zone would be left nearly intact and supplemented with additional vegetation plantings, consistent with flood conveyance needs. Some existing culverts may also be replaced to improve flood conveyance and fish passage. Whenever possible, attention to and incorporation of natural geomorphic features would take place.

(3) Combination Channel Improvements and Off-Line Sediment/Flood Storage Basins. Off-line sediment and flood storage basins may not be adequate to remove the need for channel improvements such as widening and bank armoring in select locations. This alternative would utilize storage basins and then selectively engineer the channel to convey the design flows. The riparian zone would be left as intact as feasible, and supplemented with additional vegetation plantings consistent with flood conveyance needs and mitigation requirements. Some existing culverts may also be replaced to improve flood conveyance and fish passage. Whenever possible, attention to and incorporation of natural geomorphic features would take place.

Additional alternatives may be generated as the GRR proceeds through the plan formulation process.

Other alternatives considered but eliminated from further detailed analysis

The alternatives that were originally studied under the Feasibility Study would be identified in order to ensure that a complete formulation process is documented. Additionally, the outputs of the authorized plan would be compared with plans analyzed and selected within the GRR.

CHAPTER 2 - MANAGEMENT OF STUDY

GENERAL

Project Executive Committee

A Project Executive Committee shall be established by the U.S. Army Corps of Engineers, Sacramento District and SCVWD for the planning, engineering, and design of the Berryessa Creek Project. The Executive Committee coordinates the management of the project. Corps of Engineers' membership on this committee consists of the District Engineer, Deputy District Engineer for Project Management, and the Senior Project Manager. SCVWD membership consists of the General Manager, Assistant General Manager, Executive Project Manager, and Senior Project Manager. The Executive Committee is co-chaired by the Corps of Engineers' District Engineer and the SCVWD Assistant General Manager. This committee is responsible for providing direction as well as resolving any disputes that arise during the project.

Project Management Team

The Executive Committee appointed a Project Management Team. The Senior Project Manager and representatives of Engineering Division, Program Management Branch, Planning Division, Real Estate Division, and Construction-Operations Division represent the Corps of Engineers. Non-Federal representation includes the staff of SCVWD. The Project Management Team tasks include implementing required tasks, meeting the project schedule, and day-to-day management of the execution of the GRR study. This includes monitoring schedule and budget, setting the agenda for and participating in Project Management Team meetings, coordinating with and writing scopes of service to Corps technical elements, writing miscellaneous correspondence, providing coordination and input to project management, coordinating A-E contracts, and coordinating with the non-Federal Partner.

Table 2.1 Berryessa Creek Project Executive Committee Roster

Organization	Name/Title	Address	Phone
Corps of Engineers Sacramento District	Michael Walsh District Engr.	1325 J Street Sacramento, CA 95814	(916) 557-7490 (916) 557-7859 FAX
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Santa Clara Valley Water District	Marc Klemencic Asst. Operating Officer	5750 Almaden Expwy. San Jose, CA 95118	(408) 265-2600 x2084 (408) 323-0816 FAX
Santa Clara Valley Water District	George Fowler Sr. Project Manager	5750 Almaden Expwy. San Jose, CA 95118	(408) 265-2600 x2748 (408) 323-0816 FAX

Project Review Board (PRB)

As part of the Corps of Engineers' Regional Project Management Business Process (RPMBP) a

PRB will include the District Engineer and representatives from the technical Divisions, Program Management, and Project Management. The District PRB is one component in the overall RPMBP—which includes the PRB, the Division Program Manager (PRGM), Division PRB, and Division RMB—and is the main organizational component that has monitoring, review, and decision-making authority that interfaces directly with the Berryessa GRR. The PRB:

monitors program execution and performance status and projected performance for the fiscal year, including any changes in scope and cost estimates for the project,
reviews the status of the project, and
makes decisions on project, programmatic, and workload-leveling issues.

If a cost estimate change is necessary, a Schedule and Cost Change Request (SACCR) would be initiated. SACCRs can be initiated by the project manager, team members, or non-Federal Partner depending on changes in the scope and cost estimates as required in the Local Cooperation Agreement. The District PRB also will approve the Project Management Plan and any significant changes identified by the Project Management Team and recommended by the project manager in accordance with ER 5-7-1 and Implementation Memorandum #03D. The non-Federal Partner will attend the District PRB meetings at his discretion.

Table 2.2 Project Team Members

Organization	Name/Title	Address	Phone
CESPK-PM-C	Brandon Muncy Senior Project Manager	1325 J Street Sacramento, CA 95814	(916) 557-6682 (916) 557-7848 FAX
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A-E Contractor	Ira Artz Tetra Tech, Inc.	17770 Cartwright Rd. Ste. 500 Irvine, CA 92614-5850	(949) 250-6788 (949) 250-6776 FAX
A-E Contractor	Ken Meyers HDR Engineering	271 Turn Pike Dr. Folsom, CA 95630	(916) 351-3800 (916) 351-3188 FAX
A-E Contractor	Northwest Hydraulic Consultants Inc.	3950 Industrial Blvd, Ste. 100C West Sacramento, CA 95691	(916) 371-7400 (916) 371-7475 FAX

PROJECT MANAGEMENT TOOLS

Over the course of the GRR project, the Corps will prepare a series of reports and other information documents useful in project management. They are available to the project non-Federal Partner and are as follows:

Budgetary Documents

The budget analyst and the project manager prepare and submit budgetary documents on the project to higher headquarters. These documents, which summarize project status, expenditures to date, and Federal budget requirements for the following year, are part of a package to Congress to support the President's annual budget request.

Monthly Status Report

The project manager will prepare the status report monthly with assistance from SMT members. In the status report, the project manager will report on each project task currently under way or about to be initiated. This report also will document all important dates and milestones, meetings, task completions, etc., and expenditures for Federal and non-Federal funds compared to the approved Project Management Plan budgets. Monthly status reports will be presented to the District Project Review Board. The series of status reports, along with other documents in this Project Management Plan, will serve as the record of project progress.

Schedule and Cost Change Request

The SACCR is the form by which changes to the schedule and Project Management Plan cost estimate will be formalized. Changes may be initiated in coordination with the project team. Requests can be made to change the project scope, cost, or milestones. The initiator of the SACCR provides information to the project manager for approval of project impacts, and coordination with other SMT members. Changes to funded work items will be negotiated with the initiator of the funded work item. The PM is authorized to revise project schedules that do not impact the major milestones. Changes that extend major milestones require approval of the SPD PRB.

Scopes of Service/ Funded Work Items (FWI)

Scopes of Services (SOS's) are the basic means of assigning work tasks during the GRR project. A funded work item will be issued for each work task described in the Project Management Plan. Each funded work item will describe the scope and schedule for the task, and the funds provided to complete the task. The project manager through the Corps SOS system will distribute the work tasks and funds. SOS's will be prepared electronically using PROMIS, CEFMS, and District database. Scope of Services will be based on the scopes of work negotiated with Corps technical elements. Scopes of Service expire at the end of each Federal fiscal year and must be renegotiated for a new fiscal year.

Quality Control/Assurance Plan

The quality control/assurance plan is to ensure high quality by establishing the appropriate review of technical products and processes to ensure that they meet customer requirements and comply with applicable laws, regulations, and sound technical practices of the disciplines involved. Refer to Chapter 5 for information on the quality control plan.

CHAPTER 3 – SCOPE OF SERVICES AND GRR COST ESTIMATE

OVERVIEW OF GRR STUDY EFFORT

The following is a brief overview of the tasks to be accomplished during the GRR study. A more detailed description of the study tasks is provided in the Detailed Scope of Services subsection, with specific work elements, products, and cost estimates. A summary cost estimate is provided in Table 3.1 of this chapter.

Upon initiation of the GRR study, the project management team will assemble and review pertinent information gathered during preceding study efforts and identify additional sources of information. Additional information will include existing studies, reports, field data, aerial photos, topographic maps, existing Geographical Information System (GIS) mapping data, gauging station records, and hydrologic and hydraulic models relevant to the project area. The field data collection will include sediment sampling, flow monitoring, habitat surveys, species surveys, structure-by-structure economic inventory, and water and sediment quality analyses. After reviewing all the available information the project team will conduct an iterative assessment of the environmental resources, the environmental impacts to endangered species in the study area, with emphasis on environmental protection, flood protection, erosion and sediment control, and recreation. In addition, information gathered during field visits will be used to draw associations between flooding and erosion/sedimentation problems to identify opportunities and constraints for project. The GRR study will build upon the available pertinent studies and involve meeting with resource agency representatives, conducting field visits, and holding public meetings to solicit public input.

Following study scoping, feasibility-level studies will be conducted to further establish the existing and future with- and without-project conditions in the study area. The studies will evaluate physical conditions (hydrology, hydraulics, soils, slope, geomorphology and sedimentation), biological resources (vegetation, wildlife, fish, insects, special-status species), and social and economic resources (land use, cultural resources, HTRW). Hydrologic studies will focus on historical watershed precipitation data, land use, delineation of watershed and sub-shed boundaries, and existing (baseline conditions) and future hydrologic modeling. Hydraulic studies will focus on evaluating any existing hydraulic models, developing stage-discharge relationships, computing channel capacities at selected locations, and comparing channel capacities and computed flows from hydrology models and calculations to identify potential flooding problems. Biological and socioeconomic studies will focus on identifying special-status species distribution and critical habitats, water quality parameters, historical, and archaeological resources, HTRW sites, and existing land uses types in the area.

Once the existing and future with- and without-project conditions are established, potential project modifications and any mitigation measures that may be necessary will be refined and described. Emphasis will be placed on feasible measures that meet multiple objectives, including flood and sediment-related damage reduction, sedimentation and erosion control, environmental protection, and recreation.

A series of preliminary project alternatives will be refined based on the goals, objectives, problems, and opportunities identified by the study team, and new alternatives may be developed based on new information or ideas. Summary matrices will be prepared for each alternative identifying the various measures employed and the objectives that would be met. Schematic site drawings and section details, preliminary cost estimates based on quantities of material, labor, and operation and maintenance, and benefit assessments will be prepared for each alternative.

The alternative plans will be evaluated to determine their proposed effects on the primary project objectives of flood and sediment-related damage reduction, sedimentation and erosion control, and environmental restoration. Additionally, the alternatives will be evaluated on their completeness, effectiveness, efficiency, and acceptability. Forecasts of future with- and without-plan conditions will be developed and presented with associated differences in benefits and costs. For example, revised hydrologic and hydraulic and other technical information will be used to compare with- and without-project conditions, and to assess the potential impacts associated with modification of sub-basin hydrology. Natural and cultural resources, land use, and socioeconomic data will be used to evaluate the siting of project alternatives and to identify potential environmental impacts of the alternative plans. A cost-benefit analysis will be conducted to determine the cost-effectiveness of each alternative plan.

Based on the comparison of alternatives, a recommended plan will be selected as an integrated vision for implementation of the modified project and its long-term management. Results of the study will be documented in an integrated GRR/EIS/EIR. The environmental document will provide regulatory compliance and guidelines for maintenance and monitoring. The Draft GRR/EIS/EIR will be available for agency and public review. This documentation will be sufficient for the Corps and the SCVWD to make decisions on implementing the recommended plan.

STUDY COSTS

The GRR/EIS/EIR study cost will be part of the overall project cost and will be shared in the same proportion as that project. The GRR/EIS/EIR study cost estimate for the Berryessa Creek Project is $3,801,600. The cost estimate for each major WBS is presented in Table 3.1, "Summary Cost Estimate,"

Table 3.1 Summary Cost Estimate

WBS	Task	Cost
RAA	Surveys & Mapping Except for Real Estate	$272,000
RAC	Hydraulic Studies/Report	$478,500
RAD	Engineering & Design Analysis	$167,000
RAE	Geotechnical Studies Report	$68,000
RB	Socioeconomic Studies/Report	$159,600
RC	Real Estate Analyses/Documents	$114,800
RD	Environmental Studies/Reports	$754,000
RE	Fish & Wildlife Coord. Act Document	$90,000
RF	HTRW Studies/Report	$97,000
RG	Cultural Resource Report	$35,000
RH	Cost Estimates	$23,200
RI	Public & Collaborative Involvement	$47,500
RJ	Plan Formulation and Evaluation Reports	$150,000
RK	Report Documentation & Preparation	$185,000
RPA	Planning Coordination	$405,000
RPZ	Project Management	$395,000
RNA	Independent Technical Review	$60,000
RL	Washington Level Review	$50,000
	GRR Study Contingency	$250,000
	TOTAL	**$3,801,600**

CODE OF ACCOUNTS

For accounting and administrative purposes, all tasks including in-kind services will be organized in a "Code of Accounts" format as required by ER 1105-2-100. This cost code has been broken down into a series of sub-accounts covering project activities during the GRR study. In general, the sub-accounts relate to activities performed by a specific technical or administrative work element within the Corps. Responsible functional elements for each account code are described in detail later in this Project Management Plan. The Code of Accounts organization of tasks is called a Work Breakdown Structure. Table 3.2 provides a sample code of accounts work breakdown structure to be used for accounting and administrative purposes.

Table 3.2 Sample Code of Accounts/Work Breakdown Structure Administrative and Accounting System

Level Number	Level Description	Example	
		Accounting Code	Name
1	Project/Subproject	(none)	Berryessa Creek, CA
2	Product	R	General Reevaluation Report
3	Sub-product	(none)	(not applicable to this GRR study)
4	Activity	RA	Engineering Appendix
5	Sub-activity	RAA	Surveys and Mapping
6	Work Element	RAA-1	Detailed Site Maps

SCOPE OF SERVICES (SOS)

Below is a detailed scope of services of the major GRR/EA study tasks needed to meet the objectives identified in Chapter 1. Specifically, GRR/EA study tasks focus on the scope of effort for the Berryessa Creek Project, based upon work breakdown structure and study products. The Project Management Team and its technical staff will accomplish review and assessment of the adequacy of the tasks. Cost estimates are provided to complete each task. Work elements are listed in the WBS codes of account order described in Table 3.2.

The following terms are used in the SOS of each sub-activity element.

- **Effort:** For Corps labor charges, this is the estimated number of person-days to complete the task. This number does not represent the number of calendar days available to accomplish the task.

- **Charge Type:** Several charge types are also listed. The charge types are:

- **Corps Labor Charges:** These charges reflect Corps total labor charges including effective, indirect (departmental overhead), and overhead (District overhead) charges. Effective rate charges are derived from the rate of pay, leave, and benefits for staff assigned to a task. Indirect charges reflect non-project specific costs associated with the appropriate organizational element within the Sacramento District (Planning Division) and covers such costs as space rental costs, training, and the Division Chief's and other select individuals' labor. Overhead charges reflect non-project specific costs associated with select elements within the Sacramento District such as the Resource Management Office, Information Management Office, Office of Counsel, for example.

- **Architectural and Engineering (A-E) Charges or Contract Cost:** These charges reflect costs associated with work done by private consulting firms funded through the Corps.

- **Other Agency (OA) Charges:** These charges reflect costs associated with work funded by the Corps but completed by other Federal agencies such as the U.S. Fish and Wildlife Service.

- **Other Corps (OC) Charges:** These charges reflect costs associated with work funded by the Corps but completed by Corps offices other than Sacramento District such as the Hydrologic Engineering Center.

- **Other Expense (OE) Charges:** These charges reflect charges for printing, photographic services, room rentals, travel, and other similar categories.

- **Non-Federal Partner In-Kind Charges:** These costs reflect the value of work directly accomplished by the staff, partners, or consultants of the non-Federal Partner.

- **Total**: The total estimated cost for each task.

RA Engineering Appendix / Report

RAA Surveys and Mapping Except for Real Estate

Description: Design-level surveys will be provided within the channel alignment for preparing base maps to locate utilities, trees and other drainage features that will affect or be affected by this project. Surveys and mapping outside the channel will also be provided and will extend to the limits of the designated floodplain boundaries within the study area. This mapping will be at a lesser degree of accuracy as described below, yet all mapping shall use National Map Accuracy Standards.

RAA-1, Supplemental Mapping: Establish survey control based on North American Datum of 1983 (NAD83), converted to the California Coordinate System of 1983, Zone 3 (CC83-III) as referenced by available NGS and local published control monuments. Elevations will be based on the NAVD 83 as referenced by available NGS and local published benchmarks. Units will be the U.S. Survey Foot.

Set aerial control panels for planning level mapping within the Berryessa Creek floodplains. Coordinate the project aerial photography to obtain black and white stereo photography for planning and feasibility level mapping and a single color spot photo of the overall project area.

Total estimated cost to complete this task is $85,000 .

RAA-2, Aerial Photogrammetry and Mapping: Provide flight photography at elevation suitable for 1"=40 scale, and provide aerial based topography mapping with 1' contour intervals within the Berryessa Creek drainage basin covering the 500-year floodplains affected by proposed project alternatives. Forty-scale mapping would be used during the design phase (PED) while 100-scale mapping would be provided on sheets for floodplain mapping. Supplement mapping with digital orthophotography, utilizing the planning level stereo photography. The purpose of this mapping is to update topography adjacent to Berryessa Creek for identification of floodplains.

The Corps has existing topographic information, which shall be used to assist in this effort. The city of Milpitas has digital orthophotography (1"=40' with 2 foot contour intervals) for the reach of Berryessa Creek within Milpitas city limits.

Total estimated cost to complete this task is $120,000 .

RAA-3, Profiles and Cross Sections: Provide profiles along the levee centerlines or channel hinge points and cross sections sampled at minimum 500' intervals along accessible areas of the channel alignment. Supplement cross sections above and below major bridge crossings that may affect design flows.

Total estimated cost to complete this task is $16,000 .

RAA-4, Bridge Crossings and Drainage Structures: Survey data of bridge crossings and drainage structures exists at the Sacramento District office. The existing data shall be spot-checked in the field for verification. Optional work would include locating in-channel structures to include top and bottom of accessible bridge decks, drainage intakes/outfalls and other significant structures that may affect design flows. For the purposes of the PMP cost estimate it was assumed that the additional work will be necessary.

Total estimated cost to complete this task is $38,000 .

RAA-5, Utility Mapping: Survey data of utilities exists at the Sacramento District office. The existing data shall be spot-checked in the field for verification. Optional work would include establishing utility locations from existing GIS mapping supplemented by conventional data collection methods. The field staff will note inverts, type of pipe, pipe sizes, and ground shots. For the purposes of the PMP cost estimate it was assumed that the additional work will be necessary.

Total estimated cost to complete this task is $13,000 .

- **Responsible Element:** Santa Clara Valley Water District
- **Costs:** Santa Clara Valley Water District
- **Sacramento District Elements Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Santa Clara Valley Water District	0

Subtotal, Sacramento District:	$0
Contract Cost:	$0
Other Agency / Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$272,000.
Total Cost:	**$272,000**

RAB Hydrology and Hydraulic Studies Report

Description: Perform a feasibility-level hydrologic and hydraulic analysis of the without- and with-project conditions, including sediment studies, development of frequency/discharge data, geomorphic studies, and floodplain mapping. Assess the hydraulic and sediment transport efficiency of alternatives and provide hydraulic design of the selected plan.

RAB-1, Sediment and Flow Monitoring: Sampling and monitoring shall be performed during the wet season (November-March) in order to collect sediment and flow information. Dry season flow monitoring will be necessary to establish data suitable for assessment of low-flow fish passage opportunities as well as possible water quality and/or flow temperature modeling to assess potential anadromous fisheries impacts. This data is supplemental to the data contained in the Draft GDM (November 1993). The stream reach for this effort extends from upstream of Old Piedmont Road to Lower Penitencia Creek. Monitoring equipment shall be supplemental to available existing weather reports and forecasts. Data collections shall be obtained with permanent staff gages and portable recording and sampling equipment. This task includes:

- Developing monitoring plan and criteria to describe how and when data will be collected;
- Site visit to select site(s) to monitor and collect data;
- Purchase/Rent/Lease monitoring and data collection equipment/apparatus; this task requires:

- Renting or leasing equipment;
    - Training/instruction on equipment operation and maintenance;
    - Bench-test equipment/data collector(s), etc. prior to in-field setup;
    - Setup and test monitoring and data collection system in the field;
    - Enact maintenance responsibility to check on, and manage data collection equipment while in place.

- Gather and breakdown data collected by monitoring stations.

Total estimated cost to complete this task is $64,500 .

RAB-2, Hydrology: Frequency – Discharge, Frequency-Volume data required for Risk Based Analysis, as described in USACE EM 1110-2-1619, will be developed. The following data shall be obtained:

- Collect available watershed and nearby historical precipitation data;
- Collect available watershed topography and/or aerial survey data;
- Collect watershed land use projections for ultimate build-out;
- Site visit to document present-day (baseline conditions) land use in watershed and identify (R & U) index points.
- Acquire USACE and SCVWD Hydrology Criteria and guidelines on applying risk and uncertainty;
- Acquire NRCS County Soil Survey Report and mapping for Santa Clara County;
- Delineate watershed and sub-shed boundaries for hydrologic assessment;
- Acquire from SCVWD historical flood event(s) records and/or flow data for model calibration;
- Until monitoring data is available, generate synthetic information derived from other nearby gauged/monitored watersheds;

- Debug and calibrate hydrologic model using both historical as well as monitoring data;
- Develop high-flow hydrology for design and risk-based analysis (10- 25-, 50-, 100-,200-,and 500-year). For the purpose of detention basin design in the upper project reach, include flow frequency curves for 1-day, 3-day, 7-day durations, and possibly for longer periods.
- Develop low-flow (1-, 2-, and 5-year frequencies) and/or seasonal hydrology to support environmental assessment. (Calibration of the low-flow conditions is highly dependent upon the low-flow or dry season monitoring data in the absence of any presently available, existing low flow data.)

Total estimated cost to complete this task is $158,000 .

RAB-3, Geomorphology: Evaluate the existing geomorphic data available at the Corps office, mainly in the Draft General Design Memorandum (GDM) for Coyote and Berryessa Creeks, California (Berryessa Creek), dated November 1993. The following data shall be gleaned from the existing GDM and other Corps archives:

- Historical USGS quadrangle mapping;
- NRCS soil survey report(s) and mapping;
- Creek maintenance records;
- Past creek project design/construction drawings;
- Boring logs;
- Past aerial photography of project reach (as many historical flights as available);
- Bridge crossing and/or creek maintenance records;
- Bridge design/construction/as-built plans (City, County and/or State);
- Geology mapping of the project reach including contributing watershed

Total estimated cost to complete this task is $30,000 .

RAB-4, Baseline Hydraulic Analysis: An up-to-date baseline hydraulic assessment is necessary to develop existing conditions conveyance capacity and development of new pre-project floodplains for economic evaluations as well as the local flood insurance program. The following efforts for hydraulic analyses are necessary:

- Acquire Corps, FEMA and SCVWD hydraulic design criteria to meet flood insurance program and hydraulic design needs.
- Perform a field reconnaissance to confirm site conditions.
- Obtain and use SCVWD's Lower Berryessa Creek hydraulic model to establish downstream water surface control.
- Evaluate existing Corps Berryessa Creek HEC-2/HEC-RAS baseline "without project" models from 500 feet downstream of Calaveras Boulevard to 1000 feet upstream of Old Piedmont Road using the new peak flows developed by SCVWD in their hydrology update.
- In addition, a baseline model for low-flow conditions shall be developed for environmental assessment and habitat design. It is expected that the above steady state peak flow model can be used for low flows provided the cross-section geometry is adequately detailed in the existing model(s). If low-flow geometry in

the existing model is not sufficient, then additional field work or surveying will be required to refine the model(s) to a level of acceptability for low-flow assessment.

- Calibrate model to the degree practical from historic high water stages and flow monitoring efforts.
- Coordinate results to be compatible with floodplain mapping efforts.
- Coordinate and resolve hydraulic modeling and hydraulic design criteria necessary to be compatible with Corps, FEMA and SCVWD requirements.
- Determine the "non-damaging" flow for Berryessa Creek from Calaveras Blvd. upstream to Old Piedmont Road.

Total estimated cost to complete this task is $52,000 .

RAB-5, Establish Floodplains: Develop a dynamic hydraulic model for analysis of channel flow and floodplains. Using the hydraulic modeling results, define existing without- project floodplains for different return frequencies. Floodplain limits shall be determined for the 10-, 50-year, 100-year, 200-year, and 500-year frequencies. Floodplains shall be provided in both electronic and hard copy. Floodplain mapping shall show depth of flow contours for each flood frequency provided.

Once a project alternative is selected, floodplains will have to be defined for the same frequency scenarios as described above. Floodplain results will be coordinated with the economic analysis to determine residual damages.

Total estimated cost to complete this task is $40,000 .

RAB-6, Sediment Transport Assessment: Review and evaluate the geomorphology and sediment transport information contained in the Corps Draft GDM, dated November 1993. The information contained in the Draft GDM, along with other information available at the Corps, will be validated by taking some samples as follows:

- Sediment sampling of bed materials throughout the project reach; collect up to twelve bed samples and perform laboratory analysis of samples to ascertain gradation of sample. Samples should be collected at:
    - Upstream of Old Piedmont Road;
    - At the sediment basin just downstream of Piedmont Road;
    - Immediately downstream of the confluence of Berryessa Creek and Crosley Creek;
    - Immediately downstream of the confluence of Berryessa Creek and Sierra Creek;
    - Between I-680 and Montague Expressway;
    - Immediately upstream of Calaveras Blvd. and downstream of the confluence of Los Coches Creek and Berryessa Creek;

- Apply existing information on sediment transport to establish baseline "without project" conditions.

- Conduct additional analysis for the selected alternative to refine the understanding of sediment transport with a project in place. A further detailed sediment transport model assessment will be included in the analysis of the selected alternative.

Total estimated cost to complete this task is $50,000 .

RAB-7, Develop and Evaluate Alternatives: Develop an array of potential project alternatives consisting of combinations of channel improvements, levees, floodwalls, off-stream detention, and other pertinent flood reduction features for each level of protection to be analyzed. Perform preliminary level screening and optimization of project alternatives. Develop a spreadsheet of pros and cons of each alternative and determine which alternatives will not work or have a very low probability of functioning.

Total estimated cost to complete this task is $67,200 .

RAB-8, Hydraulic Design of Selected Plan: Conduct final hydraulic design for the selected plan. Additional hydraulic design tasks that will be required include review of sediment transport analysis, residual floodplain analysis, superiority analysis, and flood inducement analysis. A more complete description of hydraulic design of the selected plan is described in the attached Hydraulic Engineering Management Plant (HEMP).

Total estimated cost to complete this task is $16,800 .

- **Responsible Sacramento District Element:** Sacramento District, Engineering Division, Civil Design Branch, Hydrology, and Hydraulic Design Section, and Santa Clara Valley Water District.

- **Costs:** Sacramento District Labor and Santa Clara Valley Water District

- **Sacramento District Elements**	**Effort (in person-days)**
Engineering Division (H&H)	34
Santa Clara Valley Water District	0
Subtotal, Sacramento District:	$ 29,000.
Contract Cost:	$340,000.
Other-Agency/ Other COE Cost	$0
Other Expenses:	$0
Non-Federal Partner In- Kind Charges	$109,500.
Total Cost:	**$478,500**

RAC Engineering & Design Analysis Report with Preliminary Drawings

Description: Perform feasibility-level designs and analysis of alternatives.

RAC-1, Baseline Engineering and Analysis Report: Develop a Baseline Report summarizing the hydrology, hydraulics, geomorphic, and floodplain information. This report will include mapping exhibits of floodplains and property boundaries for use in damage inventories and overall assessment of baseline conditions for use in preparation of the GRR.

Total estimated cost to complete this task is $42,000 .

RAC-2, Alternatives Design: Prepare layout of channel of alignments, design of civil details, layout of plans, profiles, and cross-sections and calculation of civil design quantities for alternative plans. Evaluation of alternative layouts, alignments, aesthetics, components, relocation of facilities, etc. will be performed. Description of facility/utility relocations required, as a result of the proposed plans will be addressed. Methods for accomplishing relocations and land requirements will be considered. Operation and maintenance requirements for alternative plans will be quantified and costs developed.

Total estimated cost to complete this task is $75,000 .

RAC-3, Selected Plan Design: Develop final designs for the recommended plan. Develop, describe, and present sufficient design information to verify the project plan, site selection, geotechnical and structural design, selection of structures, leading to the development of final cost estimates. Determination of final geotechnical and structural design parameters will be deferred to the P&S phase. Develop taking plans for real estate including project acquisitions, access routes, disposal areas, and temporary construction easements. Develop operation and maintenance requirements, including assessing baseline performance and cost estimates for O&M. Develop engineering and construction schedules.

Total estimated cost to complete this task is $50,000 .

- **Responsible Element:** Sacramento District, Engineering Division, Civil Design Branch and Geotechnical Branch
- **Costs:** Sacramento District Labor
- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	Effort (in person-days)
Civil Design Section	6
Structural Design Section	4
Subtotal, Sacramento District	$ 7,000.
Contract Cost:	$160,000.
Other Agency / Other COE Cost	$0
Other Expenses:	$0
Total Cost:	**$167,000**

RAD Geotechnical Studies Report

Review and update existing geological and soils information for proposed project features and use to the greatest extent possible. For the levee section it is assumed that about 4000 feet of this segment will require analysis and evaluation for baseline conditions. Drill soil borings every 500 feet along each levee side. A total of 12 to 15 borings are anticipated to depths up to 20 feet. Triaxial testing will be conducted in addition to Atterberg Limits and gradation analyses. Engineering analysis will include seepage analyses and slope stability. Probabilistic approach (USACE) to the slope stability evaluation of the levees will be performed. A summary report on baseline findings will be provided describing the results of the geotechnical analyses. This report will include the log of borings, and lab test results.

Determine the need for additional explorations, develop soil design parameters and coordinate with team members as necessary. Determination of geotechnical design parameters and design of bridge foundations will be performed for the selected alternative. Other considerations to be evaluated include channel erosion protection and alternatives for constructing a "natural" channel. Additional exploration work may be required during construction. If necessary this work will be performed and results presented in the final GRR. The cost for additional geotechnical explorations is not included in the cost estimate.

Total estimated cost to complete this task is $68,000 .

- **Responsible Sacramento District Element:** Sacramento District, Engineering Division, Geotechnical Branch
- **Cost:** Sacramento District Labor
- **Sacramento District Elements**

Sacramento District Elements	**Effort (inPerson-days)**
Geotechnical Branch	8
Subtotal, Sacramento District	$ 5,000.
Contract Cost	$63,000.
Other Agency/ Other COE Cost	$0
Other Expenses:	$0
Total Cost	**$68,000**

Table 3.3 RA Engineering Analysis Report		
Element	**Description**	**Cost**
RAA	**Surveys and Mapping Except for Real Estate**	**$272,000**
RAA-1	Control Surveys	$85,000
RAA-2	Aerial Photogrammetry and Mapping	$120,000
RAA-3	Profiles and Cross Sections	$16,000
RAA-4	Bridge Crossings and Drainage Structures	$38,000
RAA-5	Utility Mapping	$13,000
RAB	**Hydrology and Hydraulic Studies Report**	**$478,500**
RAB-1	Sediment and Flow Monitoring	$64,500
RAB-2	Hydrology	$158,000
RAB-3	Geomorphology	$30,000
RAB-4	Baseline Hydraulic Analysis	$52,000
RAB-5	Establish Floodplains	$40,000
RAB-6	Sediment Transport Assessment	$50,000
RAB-7	Alternatives Evaluation	$67,200
RAB-8	Hydraulic Design of Selected Plan	$16,800
RAC	**Engineering and Design Analysis Report**	**$167,000**
RAC-1	Baseline Engineering and Analysis Report	$42,000
RAC-2	Preliminary Alternatives Design	$75,000
RAC-3	Selected Plan Design	$50,000
RAD	**Geotechnical Studies Report**	**$68,000**
	TOTAL	**$985,500**

RB Economic Analysis/Report

Description: Analyze flood damages and the NED benefits of potential alternatives in a risk-based environment.

RBA Literature and Other Studies Review

RBA-1, Literature Review: Literature review of past studies on the study area and the incorporation of generally accepted applicable economic criteria established in other District studies.

Total estimated cost to complete this task is $3,000.

RBB Floodplain Inventory Survey

RBB-1, Structural Survey: A survey of structural development of the 500-year floodplain within the study area will be conducted at a level appropriate for the HEC-FDA model. Pertinent risk-based and economic data will be collected for each structure. Among the items to be collected are structure type, condition, use, and first-floor elevation.

Total estimated cost is $12,000 .

RBB-2, Content Survey: A content survey will be conducted of commercial and industrial properties within the study area to ascertain content-to-structure value ratios for the implementation of the risk-based analysis.

Total estimated cost to complete this task is $8,000 .

RBC Floodplain Database Creation

RBC-1, Database Coordination: Floodplain reaches, data requirements, and cross-utilization of databases shall be coordinated with Hydrology and Hydraulics to ensure proper functioning of the FDA model.

Total estimated cost to complete this task is $2,500 .

RBC-2, Database Development: Each structure of the database will be cross-referenced to the appropriate water surface depth for each of the floodplains (10-, 25-, 50-, 100-, 200-, and 500-year) mapped under the requirement of RAC-5.

Total estimated cost to complete this task is $15,600 .

RBC-3, Floodplain Value Calculation: Calculation of the average depreciated replacement cost (DRC) for each existing floodplain inventory using the Marshall Evaluation Service, or a comparable method. DRC will be calculated using information described above in **RBB.**

Total estimated cost to complete this task is $5,800 .

RBD Other Non-Structural Economic Damages

RBD-1, Other Non-Structural Economic Damages: Typical non-structural damage categories of Clean-up costs, Emergency Costs, Savings in Flood Insurance Administration Costs, Vehicle Damage and others will be analyzed. For those categories suitable for inclusion into HEC-FDA the appropriate format shall be created. For those categories unsuitable for HEC-FDA analyses will be conducted using appropriate forms which may include the use of HEC-EAD, NPV techniques or other appropriate economic determination.

Total estimated cost to complete this task is $8,600 .

RBE Without-Project HEC-FDA Modeling and Reporting

RBE-1, Setup and Transfer of HEC-RAS Data: HEC-FDA requires the setup and transfer of hydrologic and hydraulic functions, channel bank characteristics, and the floodplain database data created in **RBC** above to process the effects of floods.

Total estimated cost to complete this task is $2,000 .

RBE-2, Risk-based Flood Overflow Damages: Each overflow inventory data set developed under RBC shall be analyzed under a risk-based approach in Excel with an @RISK add-in to develop estimates of the mean and standard deviation of damage for each mapped overflow for inclusion in the HEC-FDA model.

Total estimated cost to complete this task is $15,000 .

RBE-3, Estimate Without-Project Conditions: Without-project conditions will be analyzed using the HEC-FDA model. The HEC-FDA model results will be combined with the results of other non-HEC-FDA results and documented for the without project economic damages.

Total estimated cost to complete this task is $4,000 .

RBF Economic Analysis of Alternatives

RBF-1, Setup and Transfer of HEC-RAS Data: HEC-FDA requires the setup and transfer of hydrologic and hydraulic functions for each potential alternative.

Total estimated cost to complete this task is $2,500 .

RBF-2, Database Development: Each structure of the database will be cross-referenced to the appropriate water surface depth for each of the floodplains (10-, 25-, 50-, 100-, 200-, and 500-year) mapped under the requirement of RAC-5 for alternatives.

Total estimated cost to complete this task is $15,600 .

RBF-3, Risk-based Flood Overflow Damages: Under the same methodology of RBE-2 each overflow inventory data set for each alternative shall be analyzed.

Total estimated cost to complete this task is $15,000 .

RBF-4, Estimate With-Project Conditions: With-project conditions will be analyzed using the HEC-FDA model. The HEC-FDA model results will be combined with the results of other non-HEC-FDA results and documented for the without project economic damages.

Total estimated cost to complete this task is $10,000 .

RBF-5, Selected Alternative Optimization: When an alternative has been selected, an economic analysis of the optimum size and project performance shall be conducted.

Total estimated cost to complete this task is $5,000 .

RBG Economic Appendix

RBG-1, Economic Appendix: This work element covers the preparation of the draft economic appendix documenting without project damages, as analyzed, the damage reduction performances of each alternative, and the selection and optimization of the recommended plan. This includes writing, editing, and preparing graphics.

Total estimated cost to complete this task is $25,000.

RBG-2, Response to Comments: This work element covers the response to comments on element RBG-1.

Total estimated cost to complete this task is $10,000 .

- **Responsible Sacramento District Element:** Planning Division, Economics Branch

- **Cost:** Sacramento District Labor

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Sacramento District Elements	**Effort (inPerson-days)**
Planning Division, Economics Branch	8
Subtotal, Sacramento District	$ 5,000
Contract Cost	$154,600
Other Agency/ Other COE Cost	$0
Other Expenses:	$0
Total Cost	**$159,600**

Table 3.4 RB Economic Analysis/Report Cost Summary

Element	Description	Cost
RBA	**Literature and Other Studies Review**	**$3,000**
RBA-1	Literature Review	$3,000
RBB	**Floodplain Inventory Survey**	**$20,000**
RBB-1	Structural Survey	$12,000
RBB-2	Content Survey	$8,000
RBC	**Floodplain Database Creation**	**$23,900**
RBC-1	Database Coordination	$2,500
RBC-2	Database Development	$15,600
RBC-3	Floodplain Value Calculation	$5,800
RBD	**Other Non-Structural Economic Damages**	**$8,600**
RBD-1	Other Non-Structural Economic Damages	$8,600
RBE	**Without-Project HEC-FDA Modeling and Reporting**	**$21,000**
RBE-1	Setup and Transfer of HEC-RAS Data	$2,000
RBE-2	Risk-based Flood Overflow Damages	$15,000
RBE-3	Estimate Without-Project Conditions	$4,000
RBF	**Economic Analysis of Alternatives**	**$48,100**
RBF-1	Setup and Transfer of HEC-RAS Data	$2,500
RBF-2	Database Development	$15,600
RBF-3	Risk-based Flood Overflow Damages	$15,000
RBF-4	Estimate with-Project Conditions	$10,000
RBF-5	Selected Alternative Optimization	$5,000
RBG	**Economic Appendix**	**$35,000**
RBG-1	Economic Appendix	$25,000
RBG-2	Response to Comments	$10,000
	TOTAL	**$159,600**

RC Real Estate Studies

Description: Conduct Real Estate supplement/plan, gross appraisal, acquisition, and other real estate analysis. Detailed task descriptions follow.

RCA Real Estate Supplement/Plan

Participation in team meetings, negotiation of work products, and monitoring of progress and findings associated with real estate study products will be necessary. Lands, easements, rights-of-way, relocations, and disposal areas (LERRDs) necessary for the project will be determined through real estate studies. Acquisition and administrative costs will also be included in the study. The District, Division, and HQ-USACE are the review and approving authorities for the cost of the land, easements, Right-of Way, relocation, dredging (borrow), and spoil areas. Past work will be utilized as much as possible in developing the real estate supplement plan.

The plan will include a general description of real property requirements, and information on: estates to be acquired, PL 91-646 relocations, minerals, facility and utility relocations, sponsors ability to acquire, baseline cost estimate, HTRW, mapping, and acquisition schedule.

Total estimated cost to complete this task is $5,600 .

RCB Gross Appraisal/Report

A gross appraisal of land costs, land damages, and resale value is necessary. Included in this task is the estimate of land costs associated with land acquired for construction of the project. Work will include property field inspections, market research, study and analysis and report writing.

The contractor must be a state-certified general real estate appraiser. The appraiser shall have knowledge of the geographic area. He shall have competency and experience in appraising the particular type of properties in the project and in preparation of all valuation reports required including gross and site specific appraisals.

If the acquisition or conveyance of water, mineral or timber rights is part of the project an appraiser who has knowledge and experience in the appraisal of those rights should be part of the appraisal team that completes the valuation assignment.

The report shall conform to the "Uniform Appraisal Standards for Federal Land Acquisitions", "Uniform Standards of Professional Appraisal Practice", (Standard 6 where applicable) and Gross Appraisal requirements to be provided by the Corps of Engineers.

The A/E contractor (if this work element is contracted out) or the non-Federal sponsor (if the work element is provided as in-kind services) should contact the Chief of the Appraisal Branch at (916) 557-6855 to review the qualifications of potential contract appraisers before selecting an appraiser to complete the real estate valuation work. Upon completion, the Corps Real Estate Appraisal Branch shall review and approve the gross appraisal.

Total estimated cost to complete this task is $34,000 .

RCC Preliminary Real Estate Acquisition Maps

RCC-1, Real Estate Base Map Preparation: Obtain digital maps of parcel boundaries to be included into the GIS database. Any information about the parcels obtained from other sources, such as structure type, damage estimates, or property value, will be linked to the parcel boundaries. The parcel information will be compiled in the GIS database to allow use in later analysis. Any electronic data provided by the County and City agencies with the digital maps will be used in the property inventory and damage assessment work.

Total estimated cost to complete this task is $23,000 .

RCC-2, Real Estate Requirements Map: Mapping will delineate the limits of the real estate requirements for the selected plan. From the preliminary real estate mapping, identify required parcels in conformance with the selected plan and develop a project ownership table for each segment of the project.

Total estimated cost to complete this task is $16,000 .

RCD Physical Takings Analysis

Physical takings analysis is not expected to be necessary because it is anticipated that the project will not modify the frequency, depth, or duration of water upon private property. This will be explained under sub-activity RCA, and therefore no cost is shown under this (RCD) sub-activity.

RCE Preliminary Attorney's Opinion of Compensability

Where owners of facilities or utilities have a vested compensable interest in property affected by the project, an attorney's investigation and determination will be required regarding real estate taking. The government will be held responsible for providing substitute facilities or utilities, if necessary, for publicly-owned roads and utilities as well as existing privately-owned railroad and utilities. The attorney's opinion of compensable interest that was prepared by the Sacramento District Real Estate Division for the Union Pacific Railroad will be reviewed, updated, and validated.

Total estimated cost to complete this task is $5,600 .

RCF Rights of Entry

During the course of the GRR studies, temporary rights of entry may be necessary for access to those properties not held by the SCVWD that may be required for surveying and geotechnical investigations. This task represents identifying the required properties and securing the rights-of-entry documentation, as required. Compensation that may be necessary and due to the property owners of the property for which rights-of-entry is required is not included in the cost of this sub-activity.

Total estimated cost to complete this task is $14,000 .

RCG All Other Real Estate Analyses/Documents

RCG-1, Coordination: Participation in team meetings, negotiation of work requirements, coordination with other offices on project data needed for Real Estates major study project, and monitoring of progress and finding associated with real estate study products.

Total estimated cost to complete this task is $11,000 .

RCG-2, Baseline Real Estate Cost Estimate: This subactivity includes accounting for the Project's total estimated real estate cost in Code of Accounts format as required by ER 1110-2-1302 under Feature Codes 01, Lands and Damages. This estimate of total real estate cost will include estimated administrative costs for all Federal and local sponsor activities necessary for completion of the project.

Total estimated cost to complete this task is $5,600 .

- **Responsible Sacramento District Element:** Real Estate Division, Acquisition Branch, Appraisal Branch, Planning & Control Branch.
- **Costs:** Sacrament District Labor
- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Acquisition Branch	4
Appraisal Branch	4
Legal Section	2
Planning and Control Branch	2
Cadastral Section	4
Subtotal, Sacramento District	$ 16,600
Contract Cost	$0
Other Agency/Other COE Cost	$0
Other Expenses	$0
Non-Federal Partner In-Kind Charges	$ 98,200
Total Cost:	**$114,800**

Table 3.5 RC Real Estate Studies Cost Estimate		
Element	Description	Cost
RCA	**Real Estate Plan**	**$5,600**
RCB	**Gross Appraisal Report**	**$34,000**
RCC	**Preliminary Real Estate Acquisition Maps**	**$39,000**
RCC-1	Real Estate Base Map Preparation	$23,000
RCC-2	Real Estate Requirements Map	$16,000
RCD	**Physical Takings Analysis**	**no cost**
RCE	**Preliminary Attorney's Opinion of Compensability**	**$5,600**
RCF	**Rights of Entry**	**$14,000**
RCG	**All Other Real Estate Analyses/Documents**	**$16,600**
RCG-1	Coordination	$11,000
RCG-2	Baseline Real Estate Cost Estimate	$5,600
	TOTAL	**$114,800**

RD Environmental Studies/Report

Description: This group of tasks includes all environmental resources analyses (biological, cultural, aesthetics) and reporting, including habitat and species surveys, Section 7 consultation and preparation of NEPA and other environmental documents. Specific tasks include consultation with USFWS and NMFS, preparation of Biological Assessments, preparation of the draft and final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), preparation of a Mitigation and Monitoring Plan, compliance with the National Historic Preservation Act, coordination with the SHPO, CDFG, and other state agencies, and other actions in compliance with NEPA, CEQA, and other pertinent laws and regulations. The Environmental Resources Branch will be the responsible Corps element for these tasks.

RDA Environmental Program Management and Coordination: Shall participate in developing and evaluating alternatives, with coordination of other elements. Attend study team meetings, attend interagency and public meetings, review pertinent data and reports, advise on environmental aspects of alternatives, design and coordinate technical studies needed to establish baseline conditions and formulate alternatives; oversee contracts and products of technical studies.

Total estimated cost to complete this task is $134,000 .

RDB Impacts/Benefits Analysis and Report: A methodology for evaluating and quantifying the potential impacts and benefits to fish and wildlife habitat will be developed and utilized both for the without-project condition and for each potential alternative and mitigation element. A HEP methodology may be utilized, or other method as determined appropriate by the environmental coordinator, USFWS, NMFS, and other agency staff. The work includes attending meetings, choosing appropriate methods and models, field work to assess existing conditions, data analysis, identification of impacts and potential mitigation alternatives, and report preparation. Other tasks include writing scopes of work and contract oversight. The report will document baseline conditions and quantify impacts and benefits from all alternatives and mitigation elements, including the no-action alternative.

Total estimated costs for completing this task is $35,000 .

RDC Mitigation and Monitoring Plan

RDC-1, Mitigation and Monitoring Plan: Use evaluation methodology described above to document mitigation requirements for the selected alternative; develop preliminary design of all required mitigation; coordinate with resource agencies; write scopes of work and manage contract to write report; develop a detailed mitigation plan; and review and comment on report.

Total estimated costs for completing this task is $40,000 .

RDC-2, Mitigation Plan Incremental Cost Analysis: Based on quantified potential impacts, develop estimates of required mitigation benefits and mitigation costs for each alternative for input to economist; assist cost estimating in developing mitigation costs for the selected plan.

Total estimated costs for completing this task is $15,000 .

RDD Section 7 Consultation with USFWS/NMFS

RDD-1, Coordination and Review: The Environmental Branch, Corps of Engineers will request Section 7 consultation with the USFWS and NMFS; prepare draft and final Biological Assessments (one for NMFS, and one for USFWS-coordinated species); review draft and final BAs, and conduct all coordination with NMFS and USFWS.

Total estimated costs for completing this task is $50,000 .

RDE Habitat, Wildlife and Fisheries Surveys

RDE-1, Aquatic Habitat Survey: Conduct habitat assessment of Berryessa Creek channel and riparian zone from confluence with Lower Penitencia Creek to one mile upstream of Old Piedmont Road. Survey will preferably be conducted in May when there is a likelihood of the stream being perennial in all or most reaches, but after critical breeding season for red-legged frogs. Reaches will be classified based on gradient, substrate type, adjacent land use and other characteristics; reaches will be a minimum of 100 m long. Each reach will be characterized using an appropriate methodology, such as the method outlined in the CDFG Stream Restoration Manual (1998). Information collected in each reach will include bankfull width and depth, measurements of each habitat unit, a large woody debris (LWD) inventory, visual substrate description, documentation of fish passage barriers (height, depth, velocity, etc.), riparian zone composition and width, water velocity (if any), water temperature, visual description of bank condition (eroding, stable, etc.), floodplain connectivity, and an invertebrate kick sample where feasible.

Estimated total cost to accomplish this task is $20,000 .

RDE-2, Steelhead Survey: Survey for adult steelhead during December through March (either in 2000-2001 or 2001-2002). Survey by walking creek banks during daytime within 24 hours after rainstorms (on ideal schedule of every two weeks), looking for adult steelhead and potential redds. Index reaches will be surveyed; estimate a total of 5 reaches surveyed including greenbelt and reach above Old Piedmont Road. A maximum of 8 surveys will be conducted. Also coordinate with CDFG or other agencies that may be conducting surveys in Coyote Creek watershed. Provide written memo of results and conclusions.

Estimated total cost to accomplish this task is $20,000 .

RDE-3, California Red-Legged Frog Survey: Survey for red-legged frogs in June 2001. Aquatic habitats identified as suitable for red-legged frogs during the aquatic habitat survey (from mouth of Berryessa Creek to one mile upstream of Old Piedmont Road) will be surveyed for frogs. All protocols identified in the USFWS Guidance on Field Surveys for CA Red-legged Frogs (2/18/97) will be followed. Sampling will be conducted at all potential habitat sites, two times each during the daytime and the night, with a minimum of 24 hours between surveys. Prepare a draft and final report of data, results and conclusions. Coordinate with USFWS staff prior to conducting the study.

Total estimated cost for completing this task is $15,000 .

RDE-4, Tree Survey for Selected Alternative: After selecting an alternative, and developing an expected project footprint, conduct a survey of all trees and significant shrubs which may be affected (removed, damaged, etc.) by construction of the project. This cost item is for a qualified biologist to identify all trees previously mapped by a land surveying team in the project area. Prepare map and summary memo of results.

Total estimated cost for completing this task is $5,000 .

RDE-5, Bird Survey (Migratory and Sensitive Species): Survey of wintering and breeding migratory birds including raptors, waterfowl and passerine species. Also specifically survey for sensitive and listed species expected to occur in Santa Clara County (e.g., tricolor blackbird, golden eagle, long-eared owl, burrowing owl, northern harrier, black swift, white-tailed kite, prairie falcon, bank swallow). Surveys will be conducted every two weeks from November through June. Surveys will be conducted in 5-6 index reaches of Berryessa Creek and Lower Penitencia Creek. Index reaches will be field determined, but will be at least 500 meters in length, and will occur in the following general locations: 1) upstream of Old Piedmont Road; 2) in the greenbelt area; 3) between Hwy 680 and Montague Expwy.; 4) downstream of Piedmont Creek confluence; 5) in the SCVWD reach; and 6) along Lower Penitencia Creek downstream of Berryessa Creek confluence. Coordinate with CDFG or other agencies that may also be conducting breeding bird surveys, etc. Prepare written memo of results and conclusions.

Estimated total cost to accomplish this task is $25,000 .

RDF Water and Sediment Quality Studies

RDF-1, Temperature Sampling: Install 3 temperature continuous loggers (Stowaway™, or equivalent) in Berryessa Creek from March, 2001 through February, 2002 (or as long as feasible). Download information every two months into spreadsheet or database. Loggers will be installed in appropriate locations to understand major temperature changes through the system (i.e. at Old Piedmont Road, at Calaveras Blvd., etc.). Prepare report of results and conclusions.

Total estimated cost for completing this task is $25,000 .

RDF-2, Water and Sediment Quality Study: Sample water in Berryessa Creek for mercury[1] standard metals, nutrients, pesticides, VOCs, PAHs, TOC, pH and conductivity. Grab samples should be taken following a rainstorm when the water isn't highly turbid, in three locations: upstream of Old Piedmont Road; just downstream of the concrete-lined channel; and at Calaveras Blvd. Separate, highly clean samples will be taken for the mercury analyses. Sediments will be sampled in two locations: in the greenbelt and downstream of the concrete-lined reach. The sediments will be sampled for the same constituents as the water samples, and separate highly clean samples will be taken for the mercury analysis. Bank soils in the vicinity of the pollutant plumes will also be sampled and analyzed for standard parameters, VOCs, PAHs, TPH, and pesticides. Prepare draft and final summary reports for water and sediments. Follow all chain-of-custody protocols and QA/QC requirements.

Total estimated cost for completing this task is $50,000 .

RDG Section 404(b)(1) Analysis & 401 State Water Quality Certification

RDG-1 Section 404(b)(1) Analysis and Obtain 401 Certification: Prepare and publish public notice under Section 404, compile comments, conduct public hearing if requested, prepare section 404(b)(1) analysis, obtain section 401 certificate, or waiver thereof, from the Regional Water Quality Control Board, and complete section 404 requirements.

Total estimated costs for completing this task is $30,000 .

RDH Prepare Draft EIS/EIR

RDH-1, USFWS Coordination Act Administration: The Corps will write a scope of work and transfer funds to the USFWS for their coordination and time to provide documentation consistent with the Fish and Wildlife Coordination Act. Supervise USFWS work and provide USFWS with required information such as description of alternatives, maps of areas affected, etc.

Total estimated cost for completing this task is $30,000 .

RDH-2, NEPA Documents: Address NEPA, CEQA, and other environmental related regulations and write scopes of work and oversee the development of the EIS/EIR drafts that will update baseline assessments. Describe alternatives, estimated construction duration, borrow and disposal areas, and determine effects of alternatives on environmental resources; propose mitigation as appropriate, and integrate into GRR and review draft documents. Prepare Draft Record of Decision / Notice of Determination.

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[1] Analyze for total mercury, filtered and unfiltered methyl-mercury, and dissolved mercury.

Total estimated costs for completing this task is $175,000 .

RDH-3, Public Review and Comment: Prepare, process, and publish notifications of availability regarding the Draft EIS/EIR. Help prepare for and attend public meeting; administer statutory comment period for the draft EIS/EIR, address written and oral public comments on the draft EIS/EIR and prepare a report documenting and summarizing comments for inclusion in the Final EIS/EIR.

Total estimated cost for completing this task is $25,000 .

RDH-4, Final EIS/EIR Preparation: Incorporate changes and comments from Draft EIS/EIR, assemble into final EIS/EIR and integrate into final GRR.

Total estimated costs for completing this task is $50,000 .

RDH-5, Final Report Documentation: Prepare and process Record of Decision for Corps approval of EIS in compliance with NEPA. Prepare and process Notice of Determination (NOD) for state approval of EIR in compliance with CEQA.

Total estimated cost for completing this task is $10,000 .

- **Responsible Sacramento District Element:** Planning Division, Environmental Resources Branch, Santa Clara Valley Water District

- **Costs:** Sacramento District Labor and Santa Clara Valley Water District

- **Sacramento District Elements** / **Efforts (in person-days)**

Sacramento District Elements	**Efforts (in person-days)**
Environmental Engineering Branch	300
Subtotal, Sacramento District:	$200,000.
Contract Cost:	$495,000.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$ 59,000.
Total Cost:	**$754,000**

Table 3.6 RD Environment Studies/Report		
Element	Description	Cost
RDA	**Environmental Program Management and Coordination**	**$134,000**
RDB	**Impacts/Benefits Analysis and Report**	**$35,000**
RDC	**Mitigation and Monitoring Plan**	**$55,000**
RDC-1	Mitigation and Monitoring Plan	$40,000
RDC-2	Mitigation Plan Incremental Cost Analysis	$15,000
RDD	**Consultation with USFWS/NMFS**	**$50,000**
RDD-1	Biological Assessment	$50,000
RDE	**Habitat and Fisheries Surveys**	**$85,000**
RDE-1	Aquatic Habitat Survey	$20,000
RDE-2	Steelhead Survey	$20,000
RDE-3	California Red-Legged Frog Survey	$15,000
RDE-4	Tree Survey for Selected Alternative	$5,000
RDE-5	Bird Survey (Migratory and Sensitive Species)	$25,000
RDF	**Water and Sediment Quality Studies**	**$75,000**
RDF-1	Temperature Sampling	$25,000
RDF-2	Water and Sediment Quality Study	$50,000
RDG	**Analysis & 401 State Water Quality Certification**	**$30,000**
RDG-1	Analysis and Obtain 401 Certification	$30,000
RDH	**Prepare Draft EIS/EIR**	**$290,000**
RDH-1	USFWS Coordination Act Administration	$30,000
RDH-2	NEPA Documents	$175,000
RDH-3	Public Review and Comment	$25,000
RDH-4	Final EIS/EIR Preparation	$50,000
RDH-5	Final Report Documentation	$10,000
	TOTAL	**$754,000**

RE Fish and Wildlife Coordination Act (FWCA) Activities

Description: Studies by the USFWS will support environmental studies required by the Fish and Wildlife Coordination Act. The principal products will help refine impacts of alternative on fish and wildlife habitat, and recommend types and amounts of mitigation for habitat losses. The Corps will coordinate with the USFWS and supervise the interagency agreement as part of RDH-1, above. Work will include evaluation of environmental resources of the study area.

REA Draft and Final FWCA Reports

REA-1, Draft Coordination Act Document: Data collection and evaluation of the environmental resources of the study area. The USFWS will review alternative plans, assess alternative impacts of the environmental values of the study area, and offer recommendations concerning Fish and Wildlife enhancement. As part of this work effort the USFWS will participate as a team member in impact/benefit evaluation. A draft Planning Aid Letter, Coordination Act Compliance, or other document will be incorporated as an attachment to the draft integrated GRR/EIS/EIR.

Total estimated USFWS cost for completing this task is $60,000 .

REA-2 Final Coordination Act Document: Incorporate changes resulting from review of the draft GRR/EIS/EIR and draft Mitigation and Monitoring Plan. The Final document will be incorporated as an attachment to the final GRR/EIS/EIR.

Total estimated USFWS cost for completing this task is $30,000 .

- **Responsible Sacramento District Element:** Planning Division, Environ. Resources Branch, Environmental. Environmental Analysis Section.

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** — **Effort (in person-days)**

Sacramento District Elements	Effort (in person-days)
Environmental Analysis Section	15
Subtotal, Sacramento District:	$10,000.
Contract Cost:	$0
Other Agency/Other COE Cost:	$80,000.
Other Expenses:	$0
Total Cost:	**$90,000**

Table 3.7 RE Draft and Final FWCA Reports

Element	Description	Cost
REA	**Draft and Final FWCA Reports**	**$90,000**
REA-1	Draft Coordination Act Document	$60,000
REA-2	Final Coordination Act Document	$30,000
	TOTAL	**$90,000**

RF HTRW Studies

Description: The purpose of this work element is to identify changes that have taken place since HTRW conditions were sampled in the mid-1990's, and prepare a specific remediation plan if needed. The remediation plan should be coordinated and agreed to with all responsible parties. Note that portions of this element could be postponed until preparation of design plans if enough information and coordination takes place during the GRR study to assure confidence in the overall remediation cost.

RFA Available Information

RFA-1, Review Literature and Unpublished Data: Review existing documents of soil and groundwater sampling in the project vicinity and determine potential locations of contamination within the project footprint; review database from SCVWD and determine if enough information on baseline contaminants has been collected to document existing conditions. Obtain a current environmental regulatory database for the listing of all nearby pollutant discharges and sites.

Estimated cost for completing this task is $12,000 .

RFB Sampling and Analysis

RFB-1: Collect limited groundwater samples from existing monitoring wells, provided they are uncompromised and intact, in order to confirm similarity with previously sampled data. Analyze the samples with a priority pollutant screening for pesticides and organics. Sample and test the water of unknown source in the vicinity of the RR Bridge. If the review in RFA-1 finds that there are likely locations of soil contamination or discharge of contaminated groundwater in the project area that have not yet been sampled, then additional soil and groundwater sampling should be initiated. Total estimated cost for completing this task, assuming that the existing monitoring wells are suitable for continued sampling, is $30,000 .

RFC Coordination and Negotiation

RFC-1: Coordinate and negotiate with (1) polluters in the area that have initially expressed a willingness to share in the responsibility for treatment, and (2) the Water Quality Control Board to agree upon appropriate discharge practices and acquire necessary permits.

Estimated cost for completing this task is $15,000 .

RFD Development of a Remediation Plan

RFD-1: The initial remediation plan should be reviewed and updated based upon the testing information and the results of the discussions with the Board and the responsible parties. Site-specific remediation and cost estimates will be developed and become part of the design plans for the project, unless it is determined that the non-Federal sponsor will accomplish the remediation, if necessary, as a separate effort.

Estimated cost for completing this task is $20,000 .

RFE Reporting

RFE-1, Prepare Narrative for GRR/EIS/EIR: Prepare a narrative for incorporation into the environmental documentation and engineering appendix of the GRR/EIS/EIR.

Total estimated cost for completing this task is $20,000 .

- **Responsible Element:** Sacramento District, Engineering Division, Environmental Engineering Branch and Santa Clara Valley Water District (SCVWD).

- **Costs:** Sacramento District Labor and Santa Clara Valley Water District

- **Sacramento District Elements**	**Efforts (in person-days)**
Environmental Engineering Branch	5
Subtotal, Sacramento District:	$ 3,000.
Contract Cost:	$89,000.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$ 5,000.
Total Cost:	**$97,000**

Table 3.8 RF HTRW Studies

Element	Description	Cost
RFA	**Available Information**	**$12,000**
RFA-1	Review Literature and Unpublished Data	$12,000
RFB	**Sampling and Analysis**	**$30,000**
RFB-1	Sampling and Analysis	$30,000
RFC	**Coordination and Negotiation**	**$15,000**
RFC-1	Coordination and Negotiation	$15,000
RFD	**Development of a Remediation Plan**	**$20,000**
RFD-1	Development of a Remediation Plan	$20,000
RFE	**Reporting**	**$20,000**
RFE-1	Prepare Narrative for GRR/EIS/EIR	$20,000
	TOTAL	**$97,000**

RG Cultural Resources Report

Description: The Cultural Resources Report Task will be conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, 36 VFR 800 “Protection of Historic Properties,” and Corps Engineering Regulations 1105-2-100. This task will determine the impacts of the alternative plans on historical, architectural, and archeological resources within the various project areas. A new reconnaissance survey will be conducted to determine if continued erosion has exposed any potential cultural resource sites and if any new sites have been listed on the National Register.

RGA-1, Cultural Resource Reconnaissance: Review existing prehistoric and historic information for the project area; conduct 2 day field reconnaissance in project area focusing on areas of erosion to determine if further cultural resource sites have been exposed; initiate coordination with SHPO; and prepare memo report. Product will include: (1) field observations; (2) existing conditions description; (3) a professional

opinion on the likelihood of the presence of cultural or historic resource sites in the project footprint; (4) recommendations for mitigating effects, if any, or removal of artifacts, and (5) summary report for inclusion into the EIS/EIR.
Estimated cost for completing this task is $20,000 .

RGA-2 Cultural Resources Input into Draft and Final GRR/EIS/EIR The cultural resources studies will determine the impacts of the alternative plans on any historical, architectural, and archeological resources in the project area. A qualified archaeologist will provide input into the draft and final GRR/EIS/EIR on existing cultural resources in the project area, and an evaluation of impacts from the various alternatives with particular emphasis on the selected plan.

Estimated cost for completing this task is $15,000 .

Corps labor includes Cultural Resource Reconnaissance in conjunction with the State Historic Preservation Officer.

- **Responsible Sacramento District Element**: Planning Division, Environmental Resources Branch, Environmental Analysis Section
- **Costs:** $35,000.
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- **Sacramento District Elements** **Effort (in person-days)**

Environmental Planning Section	50
Subtotal, Sacramento District:	$ 35,000.
Contract Cost:	$0
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Total Cost:	**$35,000**

Table 3.9 RG Cultural Resources Report

Element	Description	Cost
RGA	**Cultural Resource Studies**	**$35,000**
RGA-1	Cultural Resource Reconnaissance	$20,000
RGA-2	Cultural Resources Input into Draft and Final GRR/EIS/EIR	$15,000
	TOTAL	**$35,000**

RH Cost Estimates

Description: Feasibility-level baseline cost estimates will be developed for the analyzed alternatives and the selected plan. These estimates will be the total cost (Federal and non-Federal) of implementing the project. Detailed first and annual costs estimates will be developed in the MCACES format for the selected plan.

RHA Alternative Costs: This includes preparation of cost estimates for alternative plans. Cost estimates will be developed outside of the M-CACES software. The cost estimates will be used to perform a comparative analysis of the alternative plans.

Total estimated cost to complete this task is $12,000 .

RHB Baseline Fully Funded Cost Estimate: For the selected plan, a baseline cost estimate will be developed using the M-CACES computer software and will be presented in the established civil works breakdown structure. The baseline estimate shall be the total cost (Federal and non-Federal) of implementing the project, including construction costs, lands, easements, rights-of-way, relocations, disposal areas, mitigation, engineering and design and construction management. Detailed first and annual cost estimates, including operation and maintenance, interest during construction and replacement costs will be developed in the M-CACES format for the recommended plan, in accordance with ER110-2-1302, Civil Works Cost Engineering.

Total estimated cost to complete this task is $11,200 .

- **Responsible Sacramento District Element:** Engineering Division, Cost Engineering Branch

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	Effort (in person-days)
Cost Engineering Branch	4
Subtotal, Sacramento District:	$ 2,800.
Contract Cost:	$20,400.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$0
Total Cost:	**$23,200**

Table 3.10 RH Engineering Analysis Report

Element	Description	Cost
RH	**Cost Estimates**	**$23,200**
RHA	Alternative Costs	$12,000
RHB	Baseline Fully Funded Cost Estimate	$11,200
	TOTAL	**$23,200**

RI Public Involvement

Description: Coordinate the study scope, results, and solutions with the public; conduct public meetings; and respond to public inquiries. The non-Federal Partner will have the responsibility of obtaining a meeting place for public meetings and providing audio-visual equipment.

RIA-1, EIS/EIR Scoping Meeting and Public Meeting Mailing List/Invitation: The Corps and the non-Federal Partner will update the mailing list, prepare public meeting invitations and advertisements, print and distribute the invitation. The invitation will include a summary of the existing conditions, a description of alternatives, and meeting information. The Corps and the non-Federal Partner will review the invitation.

Total estimated cost for completing this task is $7,500 .

RIA-2, Scoping Meetings and Public Meeting Preparation: The purposes of the meetings are to provide an opportunity for public comments on the GRR/EIS/EIR process. Work includes planning and setting the agenda for the meeting, development and delivery of presentations, actual conduct of the meeting, and logistics such as finding a suitable meeting place, setting up and manning a sign-in table, and providing audio visual equipment. Coordination will occur with the City of San Jose, City of Milpitas, neighborhood groups, and environmental groups, as necessary to involve all interested parties in the public meeting process. The Corps and the non-Federal Partner will review presentations, aid in production of presentation materials, and be available at the meeting to aid in making presentations, act as technical resources, perform recording duties, etc. A total of two scooping meetings, two public meetings, and a meeting with The SCVWD Board will be held in the Study Area. The first meetings will serve as a scoping meeting prior to preparation of the draft environmental document; the second meetings and the meeting with the Board will be to receive comments on the public draft GRR/EIS/EIR.

Total estimated cost for completing this task is $40,000.

- **Responsible Element:** Sacramento District, Planning Division, Sacramento Basin Branch, Programs & Project Mgmt. Division, Civil Works Branch and Santa Clara Valley Water District.

- **Costs:** Sacramento District Labor and Santa Clara Valley Water District

- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Sacramento Basin Branch	6
Programs Management Branch	6
Subtotal, Sacramento District:	$ 8,000.
Contract Cost:	$ 4,500.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$35,000.
Total Cost:	**$47,500**

Table 3.11 RI Public Involvement		
Element	**Description**	**Cost**
RIA	**Public Involvement**	**$47,500**
RIA-1	EIS/EIR Scoping Meeting and Public Meeting Mailing	$7,500
RIA-2	Scoping Meetings and Public Meeting Preparation	$40,000
	TOTAL	**$47,500**

RJ Plan Formulation and Evaluation Reports

Description: Plan formulation and evaluation includes reviewing and refining the plans selected for study during the General Reevaluation phase in accordance with ER 1105-2-100. Efforts shall resolve/refine the identified flood problems, addressing flood protection, environmental restoration, and recreation needs.

RJA-1, Formulation of Alternatives and Briefing Reports: This work element covers the initial plan formulation process as well as preparation of AFB documentation. The Corps, Contractors and the non-Federal Partner will review the problems and opportunities that have been identified under hydraulics, environmental, and economic studies. They will identify critical issues, and develop methods and preliminary alternatives for screening and subsequent optimization under RJA-2. Alternatives will be formulated with the participation of the Project Study Team and technical elements. The Corps and the Contractor will be responsible for writing, editing, and preparing graphics for the AFB. Efforts include coordination meetings to discuss design criteria and plan formulation considerations in preparation for the AFB conference. The AFB report and conference will establish the direction of the remainder of the GRR/EIS/EIR study following preliminary alternatives development. The task includes printing and distributing of the AFB documents and technical attachments. The non-Federal Partner will review rough drafts.

Total estimated cost for completing this task is $75,000 .

RJA-2, Final Plan Formulation and Optimization: This work element covers the plan formulation process through preparation of the draft report. The Corps, the Contractor, and the non-Federal Partner will perform detailed formulation of alternative plans based on guidance from the AFB. Alternatives will be developed so those technical elements may further assess, refine, and quantify hydraulic design, benefits, hydraulic effects, and environmental effects. Alternatives will be compared in accordance with Corps guidance to identify the plan that optimizes flood protection, environmental enhancement, and recreation needs. In addition, the Selected Plan will be proposed based on local preferences. Costs and benefits of each alternative will be established. Alternatives will be refined with the participation of the Project Management Team and technical elements.

Total estimated cost for completing this task is $75,000 .

- **Responsible Sacramento District Element:** Planning Division, Sacramento Basin Branch

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Sacramento Basin Branch	45
Subtotal, Sacramento District:	$ 30,000.
Contract Cost:	$120,000.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Total Cost:	**$150,000**

Table 3.12 RJ Plan Formulation and Evaluation Reports

Element	Description	Cost
RJA	**Plan Formulation and Evaluation Reports**	**$150,000**
RJA-1	Plan Formulation	$75,000
RJA-2	Formulation of Alternatives and Briefing Reports	$75,000
	TOTAL	**$150,000**

RK Report Documentation & Preparation

Description: The task will include collecting and assembling all pertinent data, reproducing, and distributing the draft and final reports which include all technical appendixes.

RKA-1, Draft Milestone Reports and GRR/EIS/EIR Preparation: This task includes compiling, editing, and preparing graphics for the F3, F4, and AFB reports, and the draft GRR/EIS/EIR. Also included are printing and distributing of the report and technical appendixes (30 copies of the milestone reports; 150 copies of the Draft GRR/EIS/EIR). Reproduction costs are included under this work element as "Other Expenses." All contractors will be responsible for assembling their respective draft Appendices in accordance with ER 1110-2-1150.

Total estimated cost for completing this task is $90,000 .

RKA-2, Final GRR/EIS/EIR Preparation: This task includes compiling, editing, and preparing graphics for the final GRR/EIS/EIR. The task includes printing and distributing of the report and technical appendixes. Reproduction costs are included under this work element as "Other Expenses." All Contractors will be responsible for assembling their respective final Appendices.

Total estimated cost for completing this task is $60,000 .

RKA-3, Update Project Management Plan (PMP) for Design Phase: An updated PMP will be prepared specifying work roles and responsibilities regarding design, construction, and operation and maintenance of the project. This task will require close coordination with the study manager, technical elements, and the non-Federal Partner. The draft PMP will be based on study results available at time of preparation. The draft PMP will be submitted with the draft GRR.

Total estimated cost for completing this task is $35,000 .

- **Responsible Sacramento District Element:** Planning Division, Sacramento Basin Branch

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** / **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Sacramento Basin Branch	40
Subtotal, Sacramento District:	$ 25,000.
Contract Cost:	$160,000.
Other Agency/Other COE Cost:	$0
Other Expenses	$0
Total Cost:	**$185,000**

Table 3.13 RK Report Documentation and Preparation

Element	Description	Cost
RKA	**Report Preparation**	**$185,000**
RKA-1	Draft GRR/EIS/EIR Preparation	$90,000
RKA-2	Final GRR-EIS/EIR Preparation	$60,000
RKA-3	Update Project Management Plan (PMP) for Design Phase	$35,000
	TOTAL	**$185,000**

RP GRR/EIS/EIR Planning and Project Management Coordination

RPA Planning

Description: Responsibility for day-to-day management of the GRR/EIS/EIR study lies with the Corps Planning Division in cooperation with the project manager, project study team, non-Federal Partner and Contractors. The Corps lead planner will monitor, manage A-E contract, and coordinate technical studies required in support of the milestone.

RPA-1, GRR/EIS/EIR Planning, Coordination: Tasks include day-to-day management of the execution of the GRR/EIS/EIR study. This includes coordinating A-E contracts, and participating in Project Management Team meetings, coordinating with and writing work orders to Corps technical elements, writing miscellaneous correspondence, providing coordination and input to project management, and coordinating with the non-Federal Partner. These tasks will also be done in other phases of the GRR/EIS/EIR study.

Total estimated cost for completing this task is $130,000 .

RPA-2, GRR Planning, Alternative Formulation Briefing: The Corps will monitor and coordinate technical studies required in support of the AFB. Under this work element, the Corps, Contractors and the non-Federal Partner will attend the AFB. This effort includes coordination of the technical review/responses to comments for the Conference Report.

Total estimated cost for completing this task is $65,000 .

RPA-3, GRR Planning, Draft GRR: The Corps will monitor and coordinate technical studies and other activities required in support of the draft report. This effort also includes coordination of the technical review and responses to comments of the draft GRR.

Total estimated cost for completing this task is $105,000 .

RPA-4, Planning, Public Meetings: The Corps and Contractor, with input from the non-Federal Partner, will conceptually formulate and review materials developed for the public meetings. Also, help write and review a memorandum documenting and summarizing results of the public review period, review the results of the public comment period and propose responses to comments. The Corps, Contractor, non-Federal Partner, and project management team will attend and may make technical presentations at the public meetings.

Total estimated cost for completing this task is $30,000 .

RPA-5, Planning, Final Report: The Corps will monitor and coordinate technical studies and other activities required in support of the final report. This effort also includes coordination of the technical review and responses to comments of the final GRR/EIS/EIR.

Total estimated cost for completing this task is $75,000 .

RPZ Program & Project Management

Description: This task includes involvement by the Programs and Project Management Division, which is responsible for managing the overall study, monitoring funds, schedule, manage project programming, and final audit.

RPZ-1, Project Management: The Project Manager (PM) will be the primary point of contact for the non-Federal Partner and is responsible for the execution of the study. The PM will coordinate with the planner and non-Federal Partner, meet bi-weekly with the non-Federal Partner and study team for in-progress status, attend other meetings as appropriate, monitor study execution and expenditures, and update the Sacramento District PRB of study progress.

Total estimated cost for completing this task is $250,000.

RPZ-2, Monthly Reports Preparation: The Project Manager will update the periodic reports listed in chapter 2 under section "Study Management Tools." The monthly reports include Project Executive Summary Report. Other reports are justification sheet, update and schedule and cost change request.

Total estimated cost for completing this task is $75,000

RPZ-3, Budget Documents, Financial Reports: The Project Manager will prepare monthly Funds Management Reports and other budget documents for use by the Corps and non-Federal Partner. This work requires working with the planner to explain expenditures and develop spending schedules.

Total estimated cost for completing this task is $50,000

RPZ-4, Final Audit Preparation: Near the completion of the study, the Corps will prepare a final audit to assure local contributions are at their proper level and settle any debts or credits.

Total estimated cost for completing this task is $20,000

- **Responsible Sacramento District Element:** Programs & Project Mgmt. Division, Planning Division, Sacramento River Basin Branch, and Santa Clara Water District

- **Costs:** Sacramento District Labor and Santa Clara Valley Water District

- **Sacramento District Elements** **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Programs Management Branch	440
Planning Division	250
Subtotal, Sacramento District:	$450,000.
Contract Cost:	$250,000.
Other Agency/Other COE Cost:	$0
Non-Federal Partner In-Kind Charges	$100,000.
Total Cost:	**$800,000**

Table 3.14 RP GRR/EIS/EIR Planning and Project Management Coordination		
Element	**Description**	**Cost**
RPA	**Planning**	**$405,000**
RPA-1	GRR/EIS/EIR Planning, Coordination	$130,000
RPA-2	GRR Planning, Alternative Formulation Briefing	$65,000
RPA-3	GRR Planning, Draft GRR	$105,000
RPA-4	Planning, Public Meeting	$30,000
RPA-5	Planning, Final Report	$75,000
RPZ	**Program & Project Management**	**$395,000**
RPZ-1	Project Management	$250,000
RPZ-2	Monthly Reports Preparation	$75,000
RPZ-3	Budget Documents, Financial Reports	$50,000
RPZ-4	Final Audit Preparation	$20,000
	TOTAL	**$800,000**

RNA Independent Technical Review

RNA-1, The independent technical review team will perform quality control and assurance on the F3, F4, and AFB reports, administrative draft, and final GRR/EIS/EIR developed by the District and the A-E contractors (including seamless review of the planning documents, environmental documents, and engineering technical appendixes). The independent technical review team will provide quality control and quality assurance on all products.. The A-E's will be responsible for performing the quality control and providing quality control certification of their respective products as part of their own review process, separate from and not included in the District's ITR effort. (See Appendix E for individual A-E Quality Control Plans).

Total estimated cost for completing this task is $60,000 .

- **Responsible Sacramento District Element:**
  Planning Division, American River Basin Branch, Sacramento Basin Branch
  Hydraulic Design Section
  Soil Design Section
  Geology and Mapping Section
  Economics Branch
  Environmental Planning Section
  Real Estate Acquisitions Branch
  Real Estate Appraisal Branch
  Real Estate Legal Section
  Cost Engineering Branch
  Civil Design Section
  Structural Design Section

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** **Effort (in person-days)**

Various District Elements (Technical Review)	75
Subtotal, Sacramento District:	$60,000.
Contract Cost:	$0
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$0
Total Cost:	**$60,000**

Table 3.15 RNA Independent Technical Review

Element	Description	Cost
RNA	**Independent Technical Review**	**$60,000**
	TOTAL	**60,000**

RL Washington Level Review/Headquarters Compliance Documents

RLA-1, Washington Review: This task is included for review and resolution of issues that may be identified as the result of the Washington-level review process, as well as preparation of compliance documents including the Chief of Engineers' certification and The Record of Decision (ROD).

- **Responsible Sacramento District Element:** Planning Division, Sacramento Basin Branch

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** **Effort (in person-days)**

Sacramento Basin Branch	40
Subtotal, Sacramento District:	$35,000.
Contract Cost:	$15,000.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Total Cost:	**$50,000**

Table 3.16 RL Washington Level Review

Element	Description	Cost
RL	**Washington Level Review**	**$50,000**
RLA-1	Washington Review	$50,000
	TOTAL	**50,000**

Contingency: To account for unanticipated efforts and unknown factors.

- **Responsible Sacramento District Element:** Programs & Project Mgmt. Division, Planning Division

- **Costs:** Sacramento District Labor

- **Sacramento District Elements** **Effort (in person-days)**

Sacramento District Elements	**Effort (in person-days)**
Sacramento Basin Branch	225
Subtotal, Sacramento District:	$150,000.
Contract Cost:	$100,000.
Other Agency/Other COE Cost:	$0
Other Expenses:	$0
Non-Federal Partner In-Kind Charges	$0
Total Cost:	**$250,000**

Table 3.17 Cost Estimate of Work Summary (in $K)

Task	Work		
	Federal*	Non-Federal Sponsor In-Kind	Total
Surveys and Mapping	0	272	272
Hydrology & Hydraulics Studies	369.8	109.5	478.5
Engineering and Design Studies	167	0	167
Geotechnical Review	68	0	68
Socioeconomic Studies/Report	159.6	0	159.6
Environmental Studies	695	59	754
Fish and Wildlife Studies	90	0	90
HTRW Studies	92	5	97
Cultural Resources Report	35	0	35
Cost Estimates	23.2	0	23.2
Public Involvement	12.5	35	47.5
Plan Formulation	150	0	150
Report Preparation	185	0	185
Planning Coordination	305	100	405
Project Management	395	0	395
Independent Technical Review	60	0	60
Washington Level Review	50	0	50
GRR Study Contingency	250	0	250
TOTAL:	**3,122.3**	**678.7**	**3,801.6**

* Note: Includes both Federal Cash and Non-Federal Sponsor Cash. (Non-federal sponsor cost share is 50% of project total cost. Therefore the non-federal sponsor cost is $1,900.8. Of this, $678.7 will be contributed as in-kind work and $1,222.1 as cash.)

CHAPTER 4 - MILESTONES & SCHEDULE

DESCRIPTION OF MILESTONES

A system of milestones has been established to help monitor and manage the study through completion. Following is a highlight of each milestone.

Initiate GRR/EIS/EIR Study (June 2001)

Work allowance is received, and first Corps charges are made.

Alternative Formulation Briefing (January 2003)

The purpose of the AFB is to review the proposed project and discuss policy issues, leading to early Washington-level buy-in of proposed recommendations and resolution of the issues. The District will present the alternative formulation and identify the tentatively selected plan. Representatives will attend the AFB from HQUSACE, SPD, District, non-Federal Partner, and contractor representatives. Pre-meeting documentation for AFB attendees will be made available at least 14 calendar days prior to the meeting. The District's Planning Division Chief will chair the meeting. A final AFB guidance memorandum will be signed and sent by HQUSACE within 10 working days of the AFB.

Draft GRR/EIS/EIR to SPD (April 2003)

The draft GRR/EIS/EIR, including the main report, environmental documents, technical appendices, and technical review documentation will be provided to SPD for review. Public review will be concurrent.

Final GRR/EIS/EIS (October 2003)

The District will submit the final GRR/EIS/EIR in accordance with guidance from ER 11-5-2-100, and include technical documentation and technical review certification.

District Engineer Letter Releasing GRR to Public (November 2003)

The District Engineer will sign a letter releasing Final GRR to the Public and to file the EIS with EPA.

Record of Decision (ROD) (January 2004)

ROD should be signed on receipt of 401 Certification, GRR approval, and EIS notice posting in the Federal Register.

Pre-Construction Agreement (March 2004)

DESCRIPTION OF SCHEDULE

See Appendix C, Project Schedule, for the list of project activities.

CHAPTER 5 - QUALITY CONTROL PLAN

NOTICE

This Quality Control Plan (QCP) has been prepared by the U.S. Army Corps of Engineers, Sacramento District, for the Berryessa Creek Project, Santa Clara County, California (Project). In addition, individual A-E Contractor QCP(s) are provided in Appendix E.

REFERENCES

a. CESPD Regulation 1110-1-8, Directorate of Engineering and Technical Services, Quality Management Plan, 14 December 1998.

b. EC 1165-203, Technical and Policy Compliance Review, 30 September 1998

c. ER 1105-2-100, Planning - Planning Guidance Notebook, 22 April 2000

d. ER 1110-1-12, Appendix C, Architect-Engineer Design Quality Control Plan, 1 June 1993

e. CESPK, Sacramento District, Quality Management Plan, 17 December 1998

f. CESPK-ED Quality Management Plan, and Civil Design Branch Quality Management Plan, December 1998

OBJECTIVE

The objective of this quality control plan (QCP) is to ensure the Berryessa Creek GRR/EIS/EIR is of high quality. Establishing the appropriate level of evaluation of technical products and processes will ensure that they meet customer requirements and comply with applicable laws, regulations, and sound technical practices of the disciplines involved.

The Sacramento District will be responsible for independent technical review for the GRR/EIS/EIR, consistent with the Sacramento District Planning Division Quality Management Plan and associated technical review implementation guidance. The District's Independent Technical Review Team (ITRT) will conduct the quality control and quality assurance on all products such as decision documents and reports. The Contractors will be responsible for conducting their own in-house quality control on products prepared by their organizations.

QUALITY GUIDELINES

Products will be reviewed for compliance with appropriate public laws; engineering regulations, circulars, and manuals; planning and policy guidance; the references cited immediately above, and standard engineering and scientific practices.

LEVEL OF DETAIL OF REVIEW

Study products will be reviewed at a feasibility level of detail. All issues raised during the final review will be documented in a comment, response, action required, and action taken format. Products will be reviewed for:

- Consistency with the approved Project Management Plan and identification of any modification or deviations in scope, magnitude of outputs, or costs.
- Compliance with established policy principles and procedures and other appropriate guidance.
- Adequacy of the analyses and products.
- Appropriateness of all planning, engineering, design, and environmental assumptions and methods, including development of without-project assumptions.
- Appropriateness of data used, including level of detail.
- Appropriateness of alternatives evaluated.
- Consistency.
- Accuracy.
- Comprehensiveness.
- Reasonableness of results.

PROJECT MANAGEMENT TEAM

The Project Management Team is an interdisciplinary group formed to develop a product that produces a decision or implementation document. See Table 2.2, "Project Team Members."

SEAMLESS REVIEW PROCESS

In-house personnel of the A-E's work will perform a continuous in-progress quality assurance oversight throughout the development of the report. Corps' technical expert(s) as determined by the Section Chief will perform Quality Control and assurance. The Quality Control Plan will be performed on three levels. First, a detailed interdisciplinary review will be conducted to ensure that the findings of all studies are properly coalesced, and checked for discrepancies, disconnects, and interference's between in-house personnel and the A-E Contractors. Second, review(s) of specific studies will be performed as required to ensure technical soundness of methodologies, techniques, assumptions, and results. Lastly, the Project Management Team members shall consult with their ITRT counterparts during the study effort to discuss assumptions, procedures, and/or interim results to preclude significant comments or impacts occurring during the final independent technical review. The A-E Contractors are responsible for performing their own quality control of their products.

PRODUCTS BY CONTRACTORS

In accordance with SPD Regulation 1110-1-08, SPD Quality Management Plan, the A-E Contractors shall be responsible for the quality control of its own work. For individual Contractor Quality Control Plan, see Appendix E.

PRODUCTS FOR REVIEW AND REVIEW SCHEDULE

During the review process, design activities and documents will be reviewed and commented on by the appropriate ITRT members. Each member of the ITRT shall prepare memoranda documenting their consultations and comments, which shall become part of the ITRT's records. All appropriate comments will be incorporated and the revised final documents will be submitted for Quality Control and Quality Assurance certifications. In addition, South Pacific Division Regulation 1110-1-8, South Pacific Division Quality Management Plan, requires the Contractors and ITRT's to complete Quality Control and Quality Assurance

Certification signature forms. Among other supporting documents and reports that will be reviewed by ITRT, the main products are shown below. The project schedule may be found in Appendix C to the Project Management Plan, "Project Schedule."

- F-3 Draft GRR/EIS/EIR
- AFB Draft GRR/EIS/EIR
- Administrative Draft GRR/EIS/EIR
- Administrative Final GRR/EIS/EIR

KNOWN POLICY ISSUES:

- O&M Responsibilities (including MMP/Adaptive Management)
- Cost Sharing Apportionment and Credit (bypass structures, recreation features, and construction of downstream features).
- Washington Level Involvement.

MAJOR GRR/EIS/EIR & TECHNICAL ISSUES

- Clarify Decision Authority for GRR/EIS/EIR Approval (SPD PAC Guidance Memo, 4/99)
  - Project Modification Cost Change is less than 20% but Federal cost is likely more than $15 Mil.
  - CESPD-ET-P to decide proper approval authority, reports, processing
  - Report changes through PRB to CESPD to HQUSACE
  - Require approval by Commander USACE and/or Congress?
  - GRR will incorporate Post Authorization Change Report in Exec Summary
  - Will CESPD waive need for GRR-related PAC Design Memorandum?
  - CESPD has responsibility for QA (technical quality & policy compliance) if GRR is approved by District Commander and QA & QC if GRR is approved by Division Commander; Determine impact on schedule

- Engineering Issues
  - Sedimentation rates
  - Low-flow rates
  - Consistency with downstream design

- Environmental Issues
  - Ability to provide fish and wildlife habitat restoration above and beyond mitigation needs
  - Recovery needs for steelhead, primarily fish passage
  - Priority to avoid impacts by developing off-line storage areas
  - Need to coordinate with recreational plans from San Jose and Milpitas
  - Need to resolve if contamination of sediments is significant

- Project Management Issues
  - Schedule, Funding (expenditures), PROMIS

CONFLICT RESOLUTION PROCEDURES

The review team leader will review applicable documentation to identify any outstanding disagreements between members of the design team and the review team. Specific issues raised in the review shall be documented in a comment, response, action required, and action taken format. Any disagreement will be brought to the attention of the appropriate function chief to facilitate resolution of any unresolved technical disagreement between the design team and review counterparts.

CONSISTENCY REVIEW BETWEEN THE ENVIRONMENTAL AND ENGINEERING DOCUMENTS

The review to ensure documentation consistency will be performed during final preparation of the GRR/EIS/EIR and will be checked by the ITRT.

INDEPENDENT TECHNICAL REVIEW TEAM

CESPK will perform the independent technical review due to (a) the uniqueness of the project combining flood protection with environmental restoration features, (b) the project's sensitivity and visibility, and (c) the District's and partners desire to provide a quality product. Members of the ITRT are listed in Table 5.1. They are representatives from the disciplines involved in product development (project management team) but independent from the design group who performed the work.

Table 5.1 Independent Technical Review Team

Name/Organization	Title/Responsibility	Phone
Mark Cowan Sacramento Basin Br, Planning Division (CESPK-PD)	ITRT Chairman / Plan Formulation	(916) 557-6721 (916) 557-7856 FAX
Michael Ramsbotham Soils Branch/ Engineering Division (CESPK-ED-D)	Civil Engineer / Geotechnical Design	(916) 557-7174 (916) 557-6803 FAX
Ken Regalado Geotechnical/Mapping (CESPK-ED-D)	Surveyor Tech / Survey and Mapping Section	(916) 557-7155 (916) 557-6803 FAX
Don Twiss Hydraulic Design Branch/ Engineering Division (CESPK-ED)	Hydraulic Engineer / Hydraulic Design	(916) 557-7259 (916) 557-6803 FAX
Mark Boedtker Design Section A/Engineering Division (CESPK-ED-C)	Civil Engineer / Structural Design	(916) 557-6637 (916) 557-7846 FAX
Bob Koenigs Environmental Resources Branch/ Planning Division (CESPK-PD-E)	Biologist / Environmental Assessment	(916) 557-6712 (916) 557-7856 FAX
Robert Browning Albuquerque, N.M., Economics (CESPA-PM-P)	Economist / Economics Branch	(505) 342-3366 (505) 342-3619 FAX
Sherman Fong Cost Estimating Br/ Engineering Division (CESPK-ED-C)	Civil Engineer / Cost Estimating	(916) 557-6980 (916) 557-7626 FAX
Laurine White Civil Design Br/ Engineering Div (CE-SPK-ED-D)	Hydrologist/ Reservoir Hydrology	(916) 557-7133 (916) 557-7863 FAX
Evon Morris Civil Project Section (CESPK-RE-CP)	Realty Specialist / Real Estate Documents	(916) 557-7447 (916) 557-7855 FAX
Kay Hutchison District Counsel (CESPK-C)	District Counsel	(916) 557-5294 (916) 557-5118 FAX

APPENDIX A

TECHNICAL REQUIREMENTS

The work to be performed consists of a feasibility level effort per the attached schedules and budgets to determine the best solution to resolve flood problems along the Berryessa Creek. This work includes preparation of an Environmental Impact Statement/Environmental Impact Report (EIS/EIR), (EA), cost and benefit evaluations, a hydraulic analysis, design calculations and drawings, preparation of an MCACES cost estimate, real estate investigations, study management, and coordination with local, State, and Federal agencies as well as environmental/other interest groups and the public. The scope of studies in terms of content and level of detail for the GRR stage effort are as defined and required by the following:

ER 5-11-1	"Project Management" Department of the Army regulation for the management of civil works projects.
ER 220-2-2 dtd 4 March 1988 33 CFR 230	"Procedures for Implementing NEPA" Department of Army regulation on environmental quality.
ER 405-1-12 (Ch. 12) Dtd 28 May 1991	"Real Estate Handbook - Local Cooperation" Department of the Army regulation establishing guidelines for real estate activities for local cooperation agreements.
ER 1105-2-100 dtd 22 April 2000	"Planning Guidance" Department of the Army regulation on policy and guidance for the conduct of civil works planning studies.
ER 1110-2-1150	"Engineering and Design for Civil Works Projects"
ER 1110-2-1302 dtd 31 Mar 1994	"Civil Works Project Cost Engineering" Department of the Army regulation establishing standards for preparing cost estimates for civil projects.
EM 1110-2-1301	"Cost Estimates - Planning and Design Stages"
U.S. Water Resources Council Publication dtd 10 March 1983	"Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation

APPENDIX B

HYDRAULIC ENGINEERING MANAGEMENT PLAN (HEMP)

(see separate HEMP document)

Hydrologic Engineering Management Plan
For
Berryessa Creek
Santa Clara County,
California

INTRODUCTION 3
General 3
Overall Study Objectives 3

PRELIMINARY INVESTIGATIONS 4
Initial Preparation 4
Coordination with other disciplines 4
Review available documents 4
Collect hydrologic data 5
Collect survey data 5
Collect bridge and culvert data 5
Develop study area vicinity maps in Intergraph format 6
Perform field reconnaissance. 6

DEVELOPMENT OF BASIN HYDRLOGIC MODEL 7
Flow Monitoring and Calibration 7
Historic Events to be Evaluated 7
Develop HEC-HMS Model to Accommodate Risk Based Analysis (RBA) 8
Hydrologic Analysis of Alternatives 9

HYDRAULIC STUDIES 10
Existing Channel Capacity Analysis (baseline hydraulics) 10
Establish Existing Floodplains 11
Baseline Sediment Transport Assessment 11
Project Alternatives Hydraulic Modeling. 11
Risk-based Analysis. 12
Hydraulic Design of Selected Plan. 13

SOFTWARE REQUIREMENTS 15
HEC-HMS 15
UNET 15
InRoads 16

REPORTING 17

INTRODUCTION

GENERAL

This Hydrologic Engineering Management Plan (HEMP) is developed to support the General Re-evaluation Report (GRR) study effort for Berryessa Creek, in San Jose and Milpitas, California. This HEMP is prepared in accordance with EP 1110-2-9, *Hydrologic Engineering Studies Design*, 31 Jul 94.

OVERALL STUDY OBJECTIVES

The objectives of the study are to: 1) develop and evaluate channel improvement design alternatives and associated features for Berryessa Creek providing varying levels of flood protection, 2) determine the most cost-effective alternative, and 3) provide a design which is environmentally acceptable.

PRELIMINARY INVESTIGATIONS

INITIAL PREPARATION

Coordination with other disciplines

Meet with project representatives from USACE and SCVWD (and their respective consultants) to review project history, update current project status, and to discuss study approach, scope, and requirements.

Meet with other USACE and SCVWD team members intermittently throughout the study and more formally after initial identification of project alternatives.

Coordinate with USACE consultant for determination of index points for hydrological, hydraulic and economic analyses.

Review available documents

The following is an inventory of existing information retrieved from various sources:

Design

- "Coyote and Berryessa Creeks, California – Berryessa Creek Element," GDM Project Study Plan, USACE Sacramento District, July 1996.
- "Preliminary Designs for Channel Modifications (Old Piedmont Road to Calaveras Boulevard)," draft Section 205 design report and appendices (two documents) for flood control on Berryessa Creek, USACE – Sacramento District, January 1983.
- "Berryessa Creek Preliminary Design Summary Report and Cost Estimate," Gill & Pulver Engineers, Inc., December 1982.
- Berryessa Creek Project Corps and District Plan Set – Half size drawing set, 16 sheets on SCVWD title/border sheets, dated September 1973.

Hydrology & Hydraulics

- "Hydrology Procedures," Santa Clara Valley Water District, December 1998.
- USACE HEC-HMS Input file, hardcopy; 100-year storm only, assembled March 1996.
- USACE Review of the GDM Hydrology, Sacramento District, February 1996.
- "Sediment Engineering Investigation and Preliminary Hydraulic Design of the Berryessa Creek Flood Control Project," Northwest Hydraulic Consultants, Inc., September 1990.
- HEC-2 Data Deck Development," Northwest Hydraulic Consultants, Inc., May 1990.
- "GDM Hydrology Report," Sacramento District USACE, August 1989; Revision comments July 1991.

- USACE HEC-HMS Input file, hardcopy, 100-year storm only, March 1989.
- USACE "Hydrology Office Report," Sacramento District USACE, August 1982.
- Draft Hydrologic Engineering Management Plan, April 2000
- LOMAR for Berryessa Creek, City of Milpitas, May 1999
- USACE Project Study Plan, July 1996
- USACE Berryessa Creek Draft GDM, Nov 1993
- USACE Interim Feasibility Report, Nov 1993
- FEMA Flood Insurance Study
- USACE Floodplain- San Francisco District USACE, 1985
- USACE Aerial – Floodplain Inventory, 1990

COLLECT HYDROLOGIC DATA

- Obtain and review available historic and design discharge, discharge frequency relationships, runoff information, etc.
- Obtain and review historic stage and flow data, rating curves and high water marks for later use in model calibration.
- Obtain and review existing HEC-2/HEC-RAS input files for Berryessa Creek and other channels i.e., Coyote and Penitencia Creeks to assist in establishing a base model.

COLLECT SURVEY DATA

- Obtain and review acquired survey data of study area in the form of an Intergraph digital terrain model (.dtm) file from USACE, Sacramento.
- Obtain and review other useful project survey data from USACE, Sacramento, and other Corps and outside sources.
- Develop Intergraph terrain model covering flood plain area using available information from county, city and/or development maps;
- Conduct additional needed surveys to complete flood plain topography for flood plain mapping.

COLLECT BRIDGE AND CULVERT DATA

- Obtain and review surveys and other data on all existing pertinent bridge crossings, culverts, and hydraulic structures from USACE, Sacramento and other Corps and outside sources.
- Determine and conduct additional bridge surveys needed.
- Prepare and maintain an inventory list of obtained and needed bridge, culvert, and hydraulic structure information.

DEVELOP STUDY AREA VICINITY MAPS IN INTERGRAPH FORMAT

- Obtain USGS quads covering the study area in 7.5' and 15' formats. Purchase electronic versions.
- Obtain additional useful maps, aerial photos, etc.
- Scan in maps for use on Intergraph.

PERFORM FIELD RECONNAISSANCE.

- Become more familiar with the project area and component streams in general. Meet with representatives of local government, municipal agencies, and irrigation districts to discuss local features, past flood conditions, O&M experiences, and other pertinent information.
- Determine Manning's 'n' values reflecting roughness conditions of existing streams.
- Photograph and document pertinent existing hydraulic structures and features downstream of project.
- Collect information on fish passage (anecdotal), habitat types and mapping, WQ data, etc.
- Information on potential off-stream storage locations.

DEVELOPMENT OF BASIN HYDRLOGIC MODEL

FLOW MONITORING AND CALIBRATION

Sampling and monitoring shall be performed during the wet season (November-March 2000-2001) in order to collect sediment and flow information. Dry season flow monitoring will be necessary to establish data suitable for assessment of low-flow fish passage opportunities as well as possible water quality and/or flow temperature modeling to assess potential anadromous fisheries impacts. These data are supplemental to the data contained in the Draft GDM (November 1993). The stream reach for this effort extends from upstream of Old Piedmont Road to Lower Penitencia Creek. Monitoring data shall supplement available existing weather reports and forecasts. Data collections shall be obtained by using portable recording and sampling equipment. This task includes:

- Developing monitoring plan and criteria to describe how and when data will be collected;
- Site visit to select site(s) to monitor and collect data;
- Purchase/Rent/Lease monitoring and data collection equipment/apparatus; This task requires:
- Renting or leasing equipment;
- Training/instruction on equipment operation and maintenance;
- Bench-test equipment/data collector(s), etc. prior to in-field setup;
- Setup and test monitoring and data collection system in the field;
- Enact maintenance responsibility to check on, and manage data collection equipment while in place.
- Gather, breakdown and analyze data collected by monitoring stations.

HISTORIC EVENTS TO BE EVALUATED

- Develop high-flow hydrology for flood control design and risk-based analysis (50-, 100-, 200-, and 500-year).
- Develop low-flow (1-, 2-, 5-, 10-, and 25-year frequencies) and/or seasonal hydrology to support environmental assessment. (Calibration of the low-flow conditions is highly dependent upon the low-flow or dry season monitoring data in the absence of any presently available, existing low flow data.)

DEVELOP HEC-HMS MODEL TO ACCOMMODATE RISK BASED ANALYSIS (RBA)

Discharge - Frequency, Volume – Frequency and individual event hydrographs for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, 500- and SPF events will be developed for use in Corps'Risk Based Analysis and project planning evaluations, as described in USACE EM 1110-2-1619. The following procedure will be followed:

- From initial preparation effort compile existing watershed and nearby historical precipitation data, watershed topography and/or aerial survey , and watershed land use projections for ultimate build-out.
- Develop rainfall nesting methodology with the Corps and apply it to develop necessary event volume and frequency information;
- From site visit identify (R & U) index points.
- Acquire USACE and SCVWD Hydrology Criteria and guidelines on applying risk and uncertainty;
- Acquire NRCS County Soil Survey Report and mapping for Santa Clara County;
- Delineate watershed and sub-shed boundaries for hydrologic assessment;
- Obtain from the SCVWD the Winzler & Kelly basin hydrology information and HMS model. Calibrate the Winzler & Kelly hydrologic model using both historical as well as monitoring data;
- Utilize SCVWD historical flood event(s) records and/or flow data for model calibration;
- Until monitoring data is available, generate synthetic information derived from other nearby gaged/monitored watersheds;
- Develop high-flow hydrology (discharge-frequency, volume-frequency and (50,100,200,and 500-year hydrographs) for flood control design and risk-based analyses.
- Perform Risk and Uncertainty analyses of the preliminary hydrology to uncertainty error bands related to possible future basin land use changes and possible effects of two different upstream detention options.
- Debug and calibrate hydrologic model using both historical as well as monitoring data;
- Optional Task: Develop low-flow (1,2,5,10, and 25-year frequencies) and/or seasonal hydrology to support environmental assessment. (Calibration of the low-flow conditions is highly dependent upon the low-flow or dry season monitoring data in the absence of any presently available, existing low flow data.)

HYDROLOGIC ANALYSIS OF ALTERNATIVES

Modifications to the baseline hydrologic model will be performed to reflect changes in the hydrology due to alternative design features and possible off-stream detention concepts. It is anticipated that up to five modified models will be developed for the alternatives analysis. These models will reflect new parameters such as:

- Detention storage
- Increased channelization
- Diversions or bypasses

HYDRAULIC STUDIES

EXISTING CHANNEL CAPACITY ANALYSIS (BASELINE HYDRAULICS)

Analysis will be performed to determine the flow capacity of the existing channel on a reach by reach basis as defined by channel conveyance characteristics such as geometry, roughness, sediment, vegetation, constrictions and other physical constraints. Results from the capacity analysis will be used to assist in plan formulation, risk-based analysis application, hydrologic modeling and floodplain determination.

- Acquire Corps, FEMA and SCVWD hydraulic design criteria to meet flood insurance program and hydraulic design needs.
- Perform a field reconnaissance to confirm site conditions.
- Obtain and use SCVWD's Lower Berryessa Creek hydraulic model to establish downstream water surface boundary condition.
- Evaluate existing Corps Berryessa Creek HEC-2/HEC-RAS baseline "without project" models from 500 feet downstream of Calaveras Boulevard to 1000 feet upstream of Old Piedmont Road using the new peak flows developed by SCVWD in their hydrology update.
- In addition, a baseline model for low-flow conditions shall be developed for environmental assessment and habitat design. It is expected that the above steady state peak flow model can be refined for low flows provided the cross-section geometry is adequately detailed in the existing model(s). If low-flow geometry in the existing model is not sufficient, then additional field work or surveying will be required to refine the model(s) to a level of acceptability for low-flow assessment.
- Calibrate model to the degree practical from historic high water stages and flow monitoring efforts.
- Coordinate results to be compatible with floodplain mapping efforts.
- Coordinate and resolve hydraulic modeling and hydraulic design criteria necessary to be compatible with Corps, FEMA and SCVWD requirements.
- Determine the "non-damaging" flow for Berryessa Creek from Calaveras Blvd. upstream to Old Piedmont Road.
- Create a baseline UNET model for routing the HEC-HMS hydrographs through the entire study reach and to assist in the delineation of existing floodplains.

ESTABLISH EXISTING FLOODPLAINS

- Using the hydraulic modeling results, define existing without- project floodplains for different return frequencies. Floodplain limits shall be determined for the 10-, 50-, 100-, 200-, and 500-year frequencies. Floodplains shall be provided in both electronic and hard copy. Floodplain mapping shall show depth of flow contours for each flood frequency provided.
- Once a project alternative is selected, floodplains will have to be defined for the same frequency scenarios as described above. Floodplain results will be coordinated with the economic analysis to determine residual damages.

BASELINE SEDIMENT TRANSPORT ASSESSMENT

Review and evaluate the geomorphology and sediment transport information contained in the Corps Draft GDM, dated November 1993. The information contained in the Draft GDM, along with other information available at the Corps, will be spot checked by taking some samples as follows:

- Sediment sampling of bed materials throughout the project reach; collect up to twelve bed samples and perform laboratory analysis of samples to ascertain gradation of sample. Samples should be collected at:
    - Upstream of Old Piedmont Road;
    - At the sediment basin just downstream of Piedmont Road;
    - immediately downstream of the confluence of Berryessa Creek and Crosley Creek;
    - Immediately downstream of the confluence of Berryessa Creek and Sierra Creek;
    - Between I-680 and Montague Expressway;
    - Immediately upstream of Calaveras Blvd. and downstream of the confluence of Los Coches Creek and Berryessa Creek;

- Apply existing information on sediment transport to establish baseline “without project” conditions. No additional HEC-6 modeling will be performed nor R&U for sediment will be performed.

PROJECT ALTERNATIVES HYDRAULIC MODELING.

- Develop digital terrain model (dtm) surfaces representing the channels of each project alternative to be analyzed using InRoads program.

  - Define horizontal and vertical channel alignments for each project alternative.
  - Develop representative templates of channel cross-section configurations for each project alternative.
  - Create channel surfaces for each project alternative.
  - Merge channel surfaces with original ground surface to create a design surface for each project alternative.
  - Use representative HEC-2/HEC-RAS formatted cross-sections from design surfaces for creating UNET models for each project alternative.
- Develop UNET models representing each project alternative. Results of the project alternative models will be compared to results of the baseline model to evaluate quantitative effects of project alternatives.
  - Determine the interior boundary conditions for each project alternative.
  - Construct UNET network models for each project alternative from HEC-2/HEC-RAS cross-sections, interior boundary conditions, and reach and storage information.
- Run UNET models for each alternative and each R&U range of discharges.
  - Perform sensitivity analysis to confirm results.
  - Primary output will be a water surface profile. Additional output parameters may include velocities, depth relative to critical depth, storage volumes, and rating curves.
- Additional analysis will be necessary for the selected alternative to refine the understanding of sediment transport with a project in place. No R&U sediment analyses will be performed. A further detailed sediment transport model assessment will be included in the analysis of the selected alternative.
  - Compare results of the baseline model to results of the project conditions model in order to evaluate effects of the alternative's projects.
  - Select best alternative(s) for plan development using Risk-based Analysis.

RISK-BASED ANALYSIS.

The primary objective of Risk-based Analysis (RBA) is the quantification of the extent of the risk and uncertainty in the design components of flood damage reduction project alternatives. It is expected that five alternatives will be analyzed. The approach combines underlying risk and uncertainty information so that the engineering and economic performance and associated reliability of a project can be expressed as probability distributions. RBA allows the comparison of project alternatives in terms of the likelihood and variability of their physical performance, economic success, and residual risks. To successfully perform RBA, coordination is required between the economic, hydrologic, and hydraulic components of a project study team including input from the geotechnical component.

- Coordinate with economic, hydrologic, and hydraulic components of project study team to define index point locations, analysis procedures, file management, etc.
- Compile required hydrologic data and modeling results into appropriate RBA format.
    - Define the discharge-frequency curve using 100 discharge versus frequency points. The frequency data must range from 0.9999 to 0.0001.
    - Determine the equivalent years of record for each index point as defined by ER 1105-2-101, "Risk-Based Analysis for Evaluation of Hydrology/Hydraulics and Geotechnical Stability, and Economics in Flood Damage Reduction Studies."
- Compile required hydraulic data and modeling results into appropriate RBA format at each index point for each project alternative.
    - Rating curves covering full range of possible flows.
    - Failure elevation and probability data.
- Compute reliability of each project alternative by running RBA software.
- Considerations to develop the standard deviation in the water surface for the risk-based analysis will include the following considerations:
    - Channel roughness coefficients increased 20 percent from the design condition.
    - Reductions in channel conveyance based on the sediment trap efficiencies and intervals between maintenance dredging cycles allowing aggradation within channel reaches were used in developing the minimum freeboard profile.
    - Vegetation along the bed and bank required for mitigation and expected growth between maintenance intervals was included in the channel roughness coefficients.
    - Superelevation.
    - Downstream development / flood plain encroachment.
    - Future changes in the upstream watershed conditions and uncertainties in the hydrology model.

HYDRAULIC DESIGN OF SELECTED PLAN.

Conduct final hydraulic design for the selected plan. Additional hydraulic design tasks that will be required include review and expansion of sediment transport analysis, residual floodplain analysis, superiority analysis, and flood inducement analysis.

- Three areas will be checked for flood inducement. These areas are: one downstream of the project, two through the project and three upstream of the project.
    - Downstream of the project potential induced flooding would be generated by the loss of overbank storage within the project. The containment of flood waters through the project reach will reduce flows through the overbank floodplain. This will pass the flood flows through the project reach faster and increase the peak discharge downstream of the project. This may also increase sediment loading downstream.
    - Residual and Induced Flooding through the project will be evaluated and a plan developed in the Interior Flood Study. Each Tributary within the project reach will be analyzed and a plan developed to control residual and induced flooding.
    - Upstream of the project flows less than the design flow have lower water surface elevations resulting from downstream channel excavation and the proposed sediment detention basin. The upstream boundary of the project will be reviewed to assure flood waters are captured for design events.

SOFTWARE REQUIREMENTS

HEC-HMS

The HEC-HMS model is designed to simulate the surface runoff response of a river basin to precipitation by representing the basin as an interconnected system of hydrologic and hydraulic components. Each component models an aspect of the precipitation-runoff process within a portion of the basin, commonly referred to as a subbasin. A component may represent a surface runoff entity, a stream channel, or a reservoir. Representation of a component requires a set of parameters which specify the particular characteristics of the component and mathematical relations which describe the physical processes. The result of the modeling process is the computation of streamflow hydrography at desired locations in the river basin.

UNET

UNET simulates one-dimensional unsteady flow through a full network of open channels. At a flow split, during sub-critical flow, the division of flow depends on the stage along each of the receiving streams, which is a function of channel geometry and downstream backwater effects. The case of a dendritic junction, or flow combination, is simpler than the full network flow split. This is due to the fact that the tributary flow is dependent only on the stage in the receiving stream. The full network is the most general problem and can include single channels, dendritic systems, or a fully looped system. Another facet of the full network model is a storage area, a lake-like region from which streams can either empty into or divert water from.

In addition to solving the network system, UNET provides the user with the ability to apply several external and internal boundary conditions including flow and stage hydrography, gated and uncontrolled spillways, bridges, culverts, and levee systems. All input, output and calculations are performed in U.S. Customary Units.

To facilitate model application, cross-section data are input in a modified HEC-2/HEC-RAS forewater format. Boundary conditions for UNET can consist of stage or flow hydrography or rating curves and can be read in from any existing HECDSS (Hydrologic Engineering Center Data Storage System) data base. For large problems, DSS is very advantageous. It eliminates the tabular input of hydrography and creates an input file that can be easily adapted to a large number of problems. Hydrography and profiles that are computed by UNET are output to DSS for graphical display and for comparison with observed data.

INROADS

InRoads is the comprehensive civil engineering component of Intergraph's family of architectural and engineering software. It is an application that addresses engineering needs across a broad spectrum of project requirements, ranging from simple to complex. InRoads provides sophisticated modeling tools that are useful in a variety of corridor projects, including railways and highways, dredging operations, channel design, and pipelines. With comprehensive alignment and coordinate geometry commands, InRoads dynamically edits graphical figures, places curves and spirals, computes intersections, and stores parcel data. InRoads also provides digital terrain modeling tools for representing the original ground surface, subsurfaces, and design surfaces, and it provides earthworks commands to evaluate the digital terrain model.

Of particular use to hydraulic modeling applications is InRoads' ability to "pull" or output HEC-2/HEC-RAS formatted cross-sections describing designed or existing channel terrain. This output is contained in a file that may be directly developed into an input file for the hydraulic modeling standard HEC-2/HEC-RAS program or any other application using HEC-2/HEC-RAS's method of channel cross-section description (e.g. UNET, HEC-RAS, HEC-6). InRoads' ability to output design surface or existing terrain descriptions in numerous formats is also highly useful for preparing input files for two-dimensional flow hydraulic modeling applications (e.g. TABS-MD, FLO-2D).

REPORTING

A technical hydrology and hydraulics report will be prepared conforming to ER 1110-2-1150, "Engineering and Design for Civil Works Projects," Appendix C, dated 31 Aug 99. The report will present a description of the data used, methods employed, assumptions made, and results obtained and will be formatted as a component of an Engineering Appendix. The report content and format will be as described below:

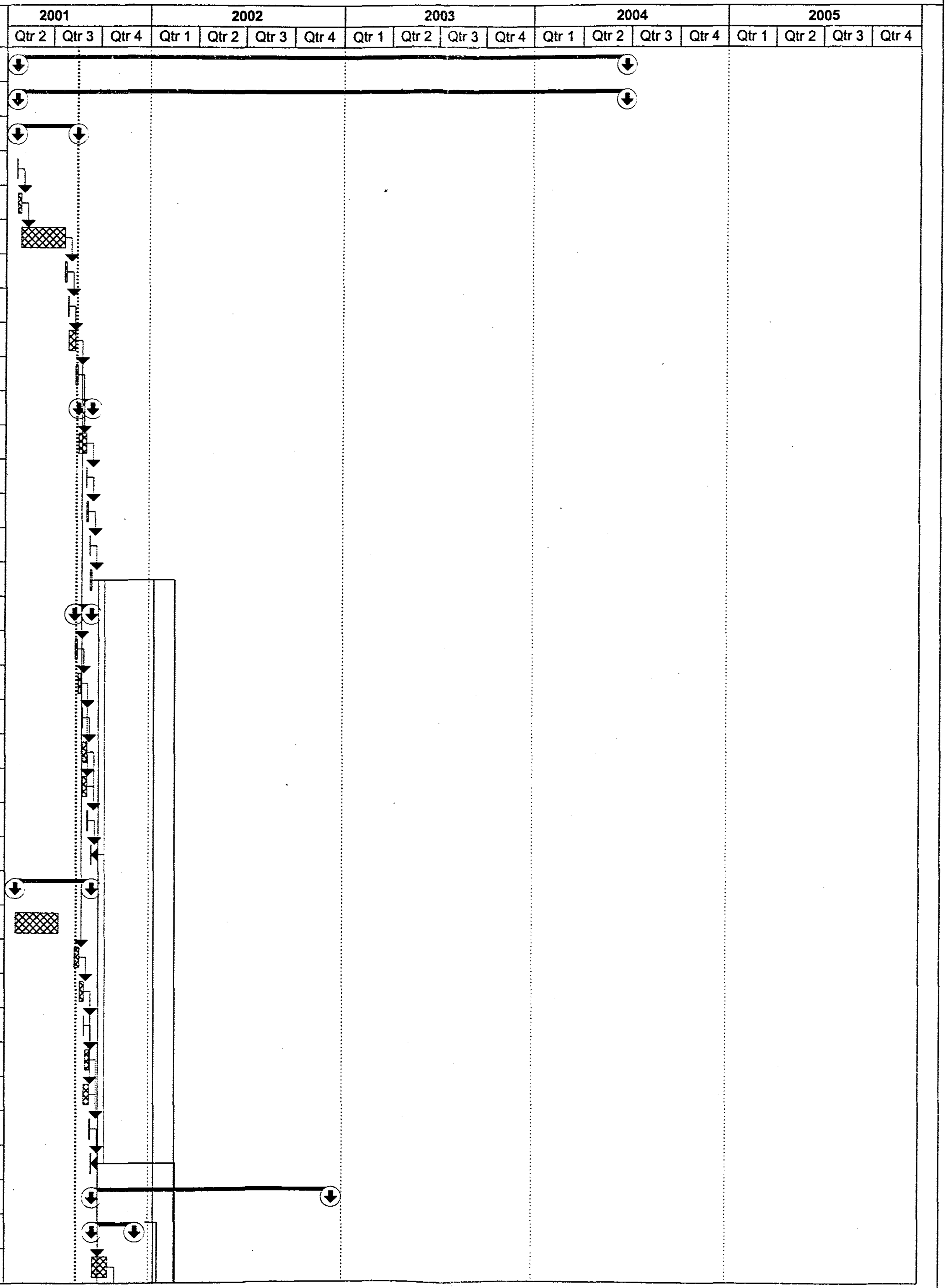
- Analytical Methods. Methods of analysis, supporting reasons for adopting selected methods, and associated relationships to features selection will be discussed. Model development, calibration, verification, and application will be presented in detail. Computer programs used in the study will be documented.
- Modeling Applications. The report will present the hydrodynamic characteristics of each project feature including channel velocities, flow distributions, and water surface profiles or contours as determined from the modeling efforts. Significance of all modeling assumptions will be discussed in sufficient detail to address operation and maintenance and other future conditions.
- Uncertainties. A discussion of uncertainties will be included in the report and how those uncertainties relate to feature development or operation and maintenance issues. The uncertainty discussion will also relate to the potential for more detailed analysis as the project details are advanced.
- Results and Interpretations. The report will not only present hydrologic and hydrodynamic details of the modeling effort but also a full engineering interpretation of those results. This interpretation will include descriptions of performance and function of the system for the full range of possible scenarios.

APPENDIX C

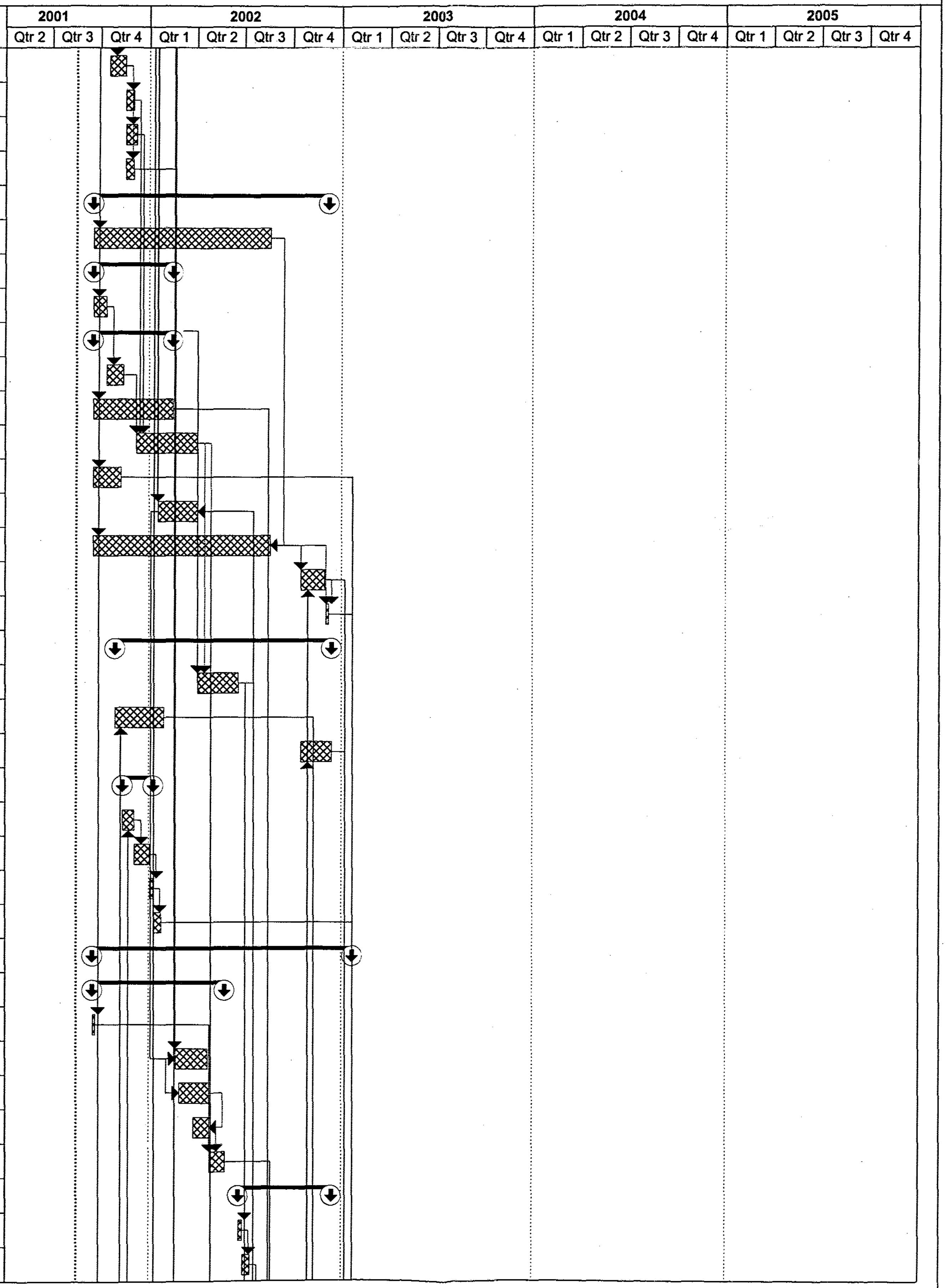
COMPLETE PROJECT SCHEDULE ATTACHED

APPENDIX C BERRYESSA CREEK GRR PMP - Schedule As of:: 14 May 2001-A

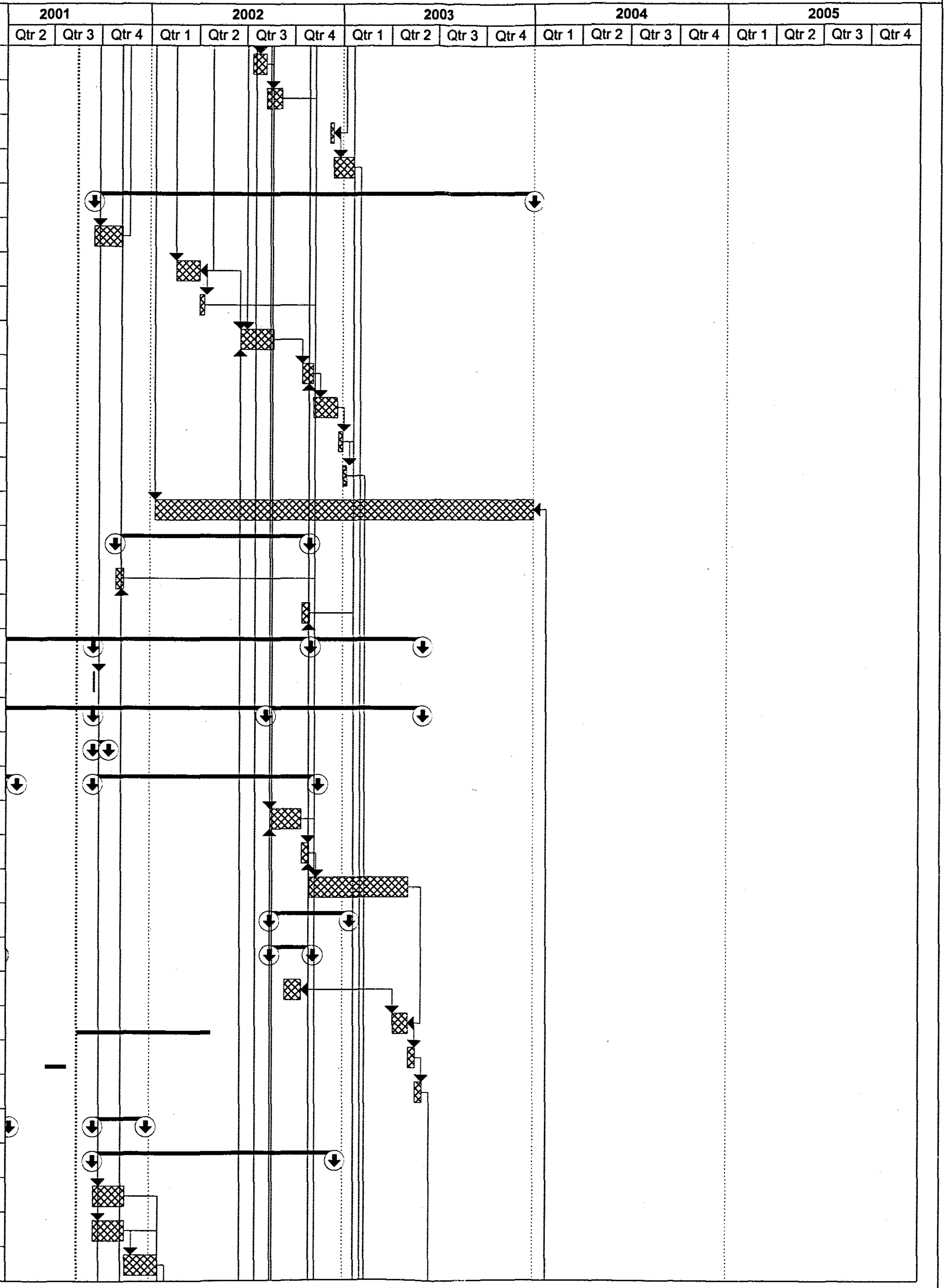
ID	Task Name	Dur	Start	Finish	Predecessors
1	**Berryessa Project**	**825 days**	**Mon 1/22/01**	**Mon 3/22/04**	
2	**General Reevaluation Report (GRR) & EIS/EIR**	**825 days**	**Mon 1/22/01**	**Mon 3/22/04**	
3	**PMP**	**85 days**	**Mon 1/22/01**	**Fri 5/18/01**	
4	Submit Final PMP	1 day	Mon 1/22/01	Mon 1/22/01	
5	COE PMP Back check	5 days	Tue 1/23/01	Mon 1/29/01	4
6	Prepare and Resubmit Final PMP	60 days	Tue 1/30/01	Mon 4/23/01	5
7	SPK Routes & Signs PMP	4 days	Tue 4/24/01	Fri 4/27/01	6
8	Mail PMP to SCVWD, etc for attachment to RCSA	1 day	Mon 4/30/01	Mon 4/30/01	7
9	Team Revises Schedule & E-mails to SCVWD	10 days	Tue 5/1/01	Mon 5/14/01	8
10	SCVWD Reviews Schedule	4 days	Tue 5/15/01	Fri 5/18/01	9
11	**RCSA**	**19 days**	**Mon 5/21/01**	**Fri 6/15/01**	
12	SCVWD routes RCSA / PMP - prep for board	10 days	Mon 5/21/01	Mon 6/4/01	10
13	SCVWD Board Approval of RCSA	1 day	Tue 6/5/01	Tue 6/5/01	12
14	SCVWD Manager Signs RCSA	3 days	Wed 6/6/01	Fri 6/8/01	13
15	SCVWD Mails signed RCSA to SPK	1 day	Mon 6/11/01	Mon 6/11/01	14
16	SPK Routes/Signs RCSA	4 days	Tue 6/12/01	Fri 6/15/01	15
17	**HDR Task Order (H & H)**	**23 days**	**Tue 5/15/01**	**Fri 6/15/01**	
18	Finalize Draft Scope of Work	4 days	Tue 5/15/01	Fri 5/18/01	9
19	SPK & HDR review/agree on Scope	5 days	Mon 5/21/01	Fri 5/25/01	18
20	SPK Requests Proposal	1 day	Tue 5/29/01	Tue 5/29/01	19
21	Prepare Fee Proposal	6 days	Wed 5/30/01	Wed 6/6/01	20
22	IGE by SPK	7 days	Tue 5/29/01	Wed 6/6/01	19
23	Review and Negotiate Contract	2 days	Thu 6/7/01	Fri 6/8/01	21,22
24	HDR receives Notice to Proceed	1 day	Fri 6/15/01	Fri 6/15/01	23,16FF
25	**Tetra Tech Task Order (Planning / Environ.)**	**104 days**	**Mon 1/22/01**	**Fri 6/15/01**	
26	IDIQ Contract/Rate Negotiations Complete	60 days	Mon 1/22/01	Fri 4/13/01	
27	Finalize Draft Scope of Work	7 days	Tue 5/15/01	Wed 5/23/01	9
28	SPK & Tetra Tech review/agree on Scope	5 days	Thu 5/24/01	Thu 5/31/01	27
29	SPK Requests Proposal	1 day	Fri 6/1/01	Fri 6/1/01	28
30	Prepare Fee Proposal	6 days	Mon 6/4/01	Mon 6/11/01	29
31	IGE by SPK	7 days	Fri 6/1/01	Mon 6/11/01	28
32	Review and Negotiate Contract	2 days	Tue 6/12/01	Wed 6/13/01	30,31
33	Tetra Tech receives Notice to Proceed	1 day	Fri 6/15/01	Fri 6/15/01	32,16FF
34	**Engineering Analysis/Report**	**324 days**	**Mon 6/18/01**	**Thu 9/12/02**	
35	**Surveys and Mapping (minus Real Estate)**	**59 days**	**Mon 6/18/01**	**Thu 9/6/01**	
36	Control Surveys	22 days	Mon 6/18/01	Tue 7/17/01	16



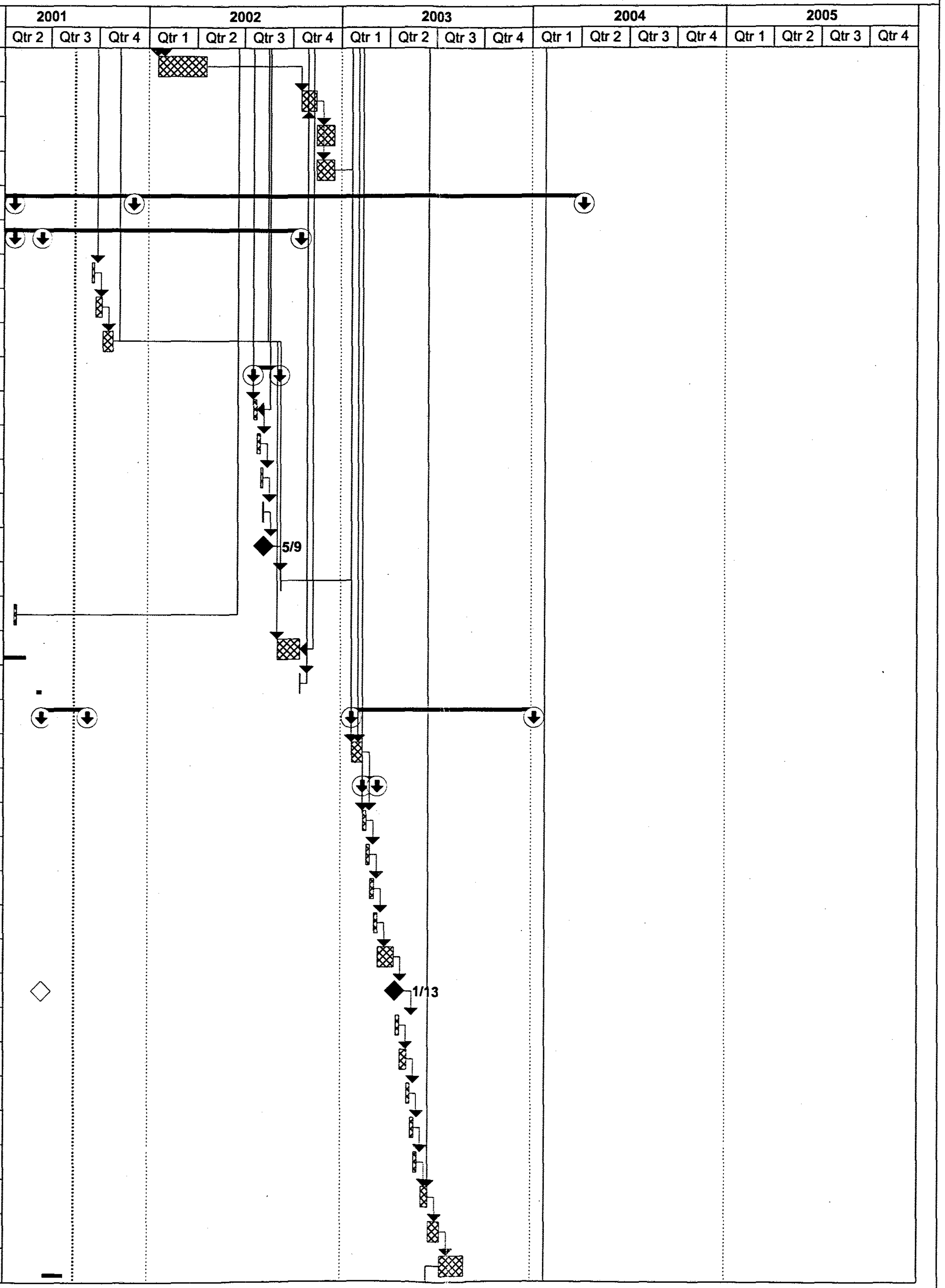
ID	Task Name	Dur	Start	Finish	Predecessors
37	Aerial Photogrammetry and Mapping	22 days	Wed 7/18/01	Thu 8/16/01	36
38	Profiles and Cross Sections	11 days	Fri 8/17/01	Fri 8/31/01	37
39	Bridge Crossings and Drainage Structures	15 days	Fri 8/17/01	Thu 9/6/01	37
40	Utility Mapping	11 days	Fri 8/17/01	Fri 8/31/01	37
41	**Hydrology and Hydraulic Studies Report**	**320 days**	**Mon 6/18/01**	**Fri 9/6/02**	
42	Sediment and Flow Monitoring	241 days	Mon 6/18/01	Mon 5/20/02	24
43	**Hydrology**	**109 days**	**Mon 6/18/01**	**Thu 11/15/01**	
44	SCVWD HEC-HMS Lwr Berryessa	19 days	Mon 6/18/01	Thu 7/12/01	16
45	**Complete Upper Berryessa Hydro**	**109 days**	**Mon 6/18/01**	**Thu 11/15/01**	
46	Peak Flows	22 days	Fri 7/13/01	Mon 8/13/01	44
47	Low Flows	109 days	Mon 6/18/01	Thu 11/15/01	24
48	Baseline Hydraulic Analysis	84 days	Fri 9/7/01	Wed 1/2/02	38,39,46
49	Geomorphology	39 days	Mon 6/18/01	Thu 8/9/01	24
50	Establish Floodplains	55 days	Thu 10/18/01	Wed 1/2/02	35,48FF
51	Sediment Transport Assessment	241 days	Mon 6/18/01	Mon 5/20/02	24,42FF
52	Hydraulic Design of Recommended Plan	33 days	Wed 7/17/02	Fri 8/30/02	156,51
53	Sed. Trans. Assessment of Recommended Plan	5 days	Mon 9/2/02	Fri 9/6/02	52,51
54	**Engnrng and Dsgn Anal. & Rprt w/ Prelim Drawings**	**294 days**	**Mon 7/30/01**	**Thu 9/12/02**	
55	Baseline Engineering and Analysis	55 days	Thu 1/3/02	Wed 3/20/02	45,48
56	Design / Evaluate / Compare Alternatives	66 days	Mon 7/30/01	Mon 10/29/01	146
57	Recommended Plan Development (Engnrg & Dsgn)	42 days	Wed 7/17/02	Thu 9/12/02	156
58	**Geotechnical Studies & Report**	**42 days**	**Mon 8/13/01**	**Tue 10/9/01**	
59	Geology Explorations & Analysis	16 days	Mon 8/13/01	Mon 9/3/01	78
60	Soil Design	21 days	Tue 9/4/01	Tue 10/2/01	59
61	Prepare Geotech Report	5 days	Wed 10/3/01	Tue 10/9/01	60
62	Engineering & Design Report & Drawings	11 days	Wed 10/10/01	Wed 10/24/01	61
63	**Economics**	**352 days**	**Mon 6/18/01**	**Tue 10/22/02**	
64	**Economic Analysis -w/out project**	**180 days**	**Mon 6/18/01**	**Fri 2/22/02**	
65	Literature and Other Studies Review	5 days	Mon 6/18/01	Fri 6/22/01	33
66	Flood Plain Inventory Survey	44 days	Wed 11/21/01	Mon 1/21/02	33,50SS+24 days
67	Flood Plain Database Creation	42 days	Wed 11/28/01	Thu 1/24/02	66SS+5 days
68	Other Non-Structural Economic Damages	22 days	Wed 12/26/01	Thu 1/24/02	67FF
69	Without Projcct HEC-FDA Modeling and Reporting	21 days	Fri 1/25/02	Fri 2/22/02	68,65
70	**Economic Analysis of Alternatives**	**126 days**	**Thu 3/21/02**	**Thu 9/12/02**	
71	Setup and Transfer of HEC-RAS Database	5 days	Thu 3/21/02	Wed 3/27/02	55
72	Database Development	11 days	Thu 3/28/02	Thu 4/11/02	71



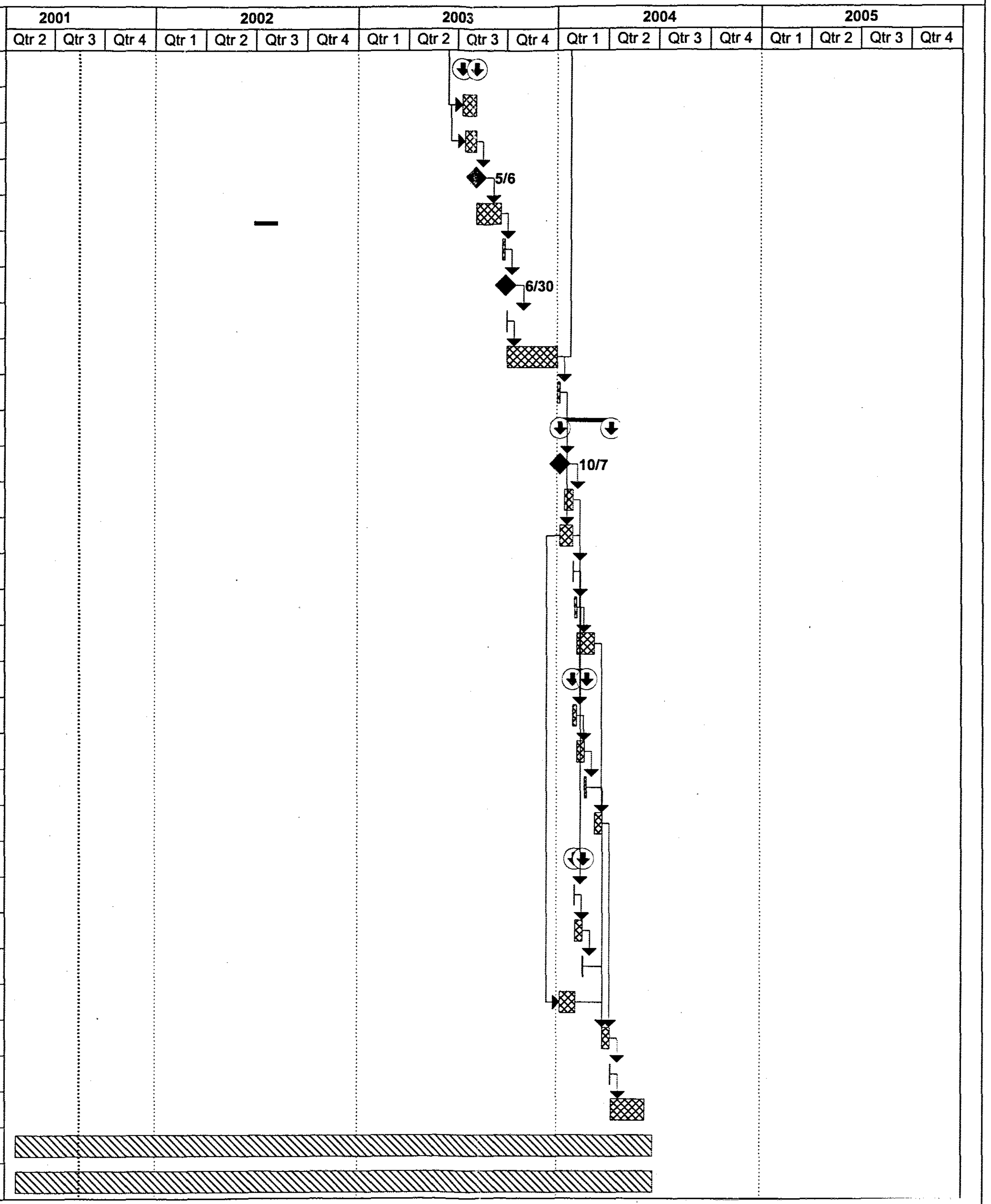
ID	Task Name	Dur	Start	Finish	Predecessors
73	Risk-Based Flood Overflow Damage	18 days	Fri 4/12/02	Tue 5/7/02	72
74	Estimates-with Project Conditions	22 days	Wed 5/8/02	Thu 6/6/02	73
75	Recomended Plan Optimization	5 days	Fri 9/6/02	Thu 9/12/02	52FF,57FF
76	Economics Appendix	28 days	Fri 9/13/02	Tue 10/22/02	75
77	**Real Estate Analyses/Documents**	**598 days**	**Mon 6/18/01**	**Wed 10/1/03**	
78	Rights of Entry	40 days	Mon 6/18/01	Fri 8/10/01	16
79	RE Base Map for Alternatives Analysis	33 days	Mon 11/19/01	Wed 1/2/02	16,50FF,40
80	Baseline Real Estate Cost Estimate	7 days	Thu 1/3/02	Fri 1/11/02	79
81	Alternatives Appraisals	45 days	Thu 3/21/02	Wed 5/22/02	79,55,154
82	RE Requirements Map for Recommended Plan	15 days	Wed 7/17/02	Tue 8/6/02	81,156
83	Gross Appraisal Report	33 days	Wed 8/7/02	Fri 9/20/02	82
84	Real Estate Supplemental Plan	7 days	Mon 9/23/02	Tue 10/1/02	83
85	Attorney's Opinion of Compensability	5 days	Wed 10/2/02	Tue 10/8/02	84
86	Coordination w/Tm, Consultant and SCVWD	515 days	Thu 10/11/01	Wed 10/1/03	16,182FF
87	**Cost Estimates**	**263 days**	**Mon 7/30/01**	**Wed 7/31/02**	
88	Comparative Cost Estimate	11 days	Mon 7/30/01	Mon 8/13/01	146
89	First Cost & Fully Funded Cost Estimate	11 days	Wed 7/17/02	Wed 7/31/02	156
90	**Environmental Studies**	**447 days**	**Mon 6/18/01**	**Tue 3/4/03**	
91	Environmental Laws Analysis	2 days	Mon 6/18/01	Tue 6/19/01	33
92	**EIS / EIR Draft**	**447 days**	**Mon 6/18/01**	**Tue 3/4/03**	
93	**NEPA/CEQA Scoping**	**22 days**	**Mon 6/18/01**	**Tue 7/17/01**	
98	**Existing & w/out Project Future Conditions**	**305 days**	**Mon 6/18/01**	**Fri 8/16/02**	
110	Effects Analysis	42 days	Fri 5/17/02	Mon 7/15/02	146,109,47,106FF,114FF
111	Biological Assessment	10 days	Wed 7/17/02	Tue 7/30/02	156,110
112	Section 7 Consultation with USFWS/NMFS	135 days	Wed 7/31/02	Tue 2/4/03	111
113	**Fish and Wildlife Coordination Act (FWCA)**	**108 days**	**Fri 5/17/02**	**Tue 10/15/02**	
119	**Mitigation**	**58 days**	**Fri 5/17/02**	**Tue 8/6/02**	
123	Sect 404(b)(1) Analysis	22 days	Fri 6/14/02	Mon 7/15/02	155FF,106
124	EIS/EIR Draft Report Preparation	22 days	Mon 1/6/03	Tue 2/4/03	123,133,112FF,118,121
125	ITR- Draft EIS/EIR	10 days	Wed 2/5/03	Tue 2/18/03	124
126	Draft EIS/EIR Completed & Copies Made	10 days	Wed 2/19/03	Tue 3/4/03	125
127	**Cultural Resource Report**	**72 days**	**Mon 6/18/01**	**Tue 9/25/01**	
134	**HTRW Studies**	**327 days**	**Mon 6/18/01**	**Tue 9/17/02**	
135	Available Information	44 days	Mon 6/18/01	Thu 8/16/01	33
136	Review Literature and Unpublished Data	44 days	Mon 6/18/01	Thu 8/16/01	33
137	Sampling and Analysis	44 days	Fri 8/17/01	Wed 10/17/01	136



ID	Task Name	Dur	Start	Finish	Predecessors
138	Coordination and Negotiation	66 days	Thu 10/18/01	Thu 1/17/02	135,136,137
139	Development of a Remediation Plan	21 days	Wed 7/17/02	Wed 8/14/02	138,156
140	Reporting	24 days	Thu 8/15/02	Tue 9/17/02	139
141	Prepare Narrative for GRR/EIS/EIR	24 days	Thu 8/15/02	Tue 9/17/02	139
142	**Planning Studies**	**771 days**	**Mon 1/22/01**	**Tue 1/6/04**	
143	**Plan Formulation**	**386 days**	**Mon 1/22/01**	**Tue 7/16/02**	
144	Identify / Categorize Measures	5 days	Mon 6/18/01	Fri 6/22/01	33
145	Screen Measures	10 days	Mon 6/25/01	Fri 7/6/01	144
146	Identify Preliminary Alternatives	15 days	Mon 7/9/01	Fri 7/27/01	145
147	**Prepare w/o Proj. Conditions Documentation**	**36 days**	**Fri 4/19/02**	**Fri 6/7/02**	
148	Establish Draft w/o Proj. Conditions Doc.	5 days	Fri 4/19/02	Thu 4/25/02	50,55,80,69FF,109
149	ITRT Reviews Draft w/out project conditions	5 days	Fri 4/26/02	Thu 5/2/02	148
150	Incorporate ITRT Comments	2 days	Fri 5/3/02	Mon 5/6/02	149
151	Finalize w/o Project Conditions Documentation	2 days	Tue 5/7/02	Wed 5/8/02	150
152	SPD & HQUSACE Reviews w/o Proj. Cond. Doc.	22 days	Thu 5/9/02	Fri 6/7/02	151
153	(F3) w/o Project Conditions / Prelim Plans Conf.	1 day	Mon 6/10/02	Mon 6/10/02	152,146
154	Refine Identified Alternatives	5 days	Mon 1/22/01	Fri 1/26/01	
155	Evaluate & Compare Alternatives	30 days	Tue 6/4/02	Mon 7/15/02	146,56FF,80FF,74FF,110FF,88FF,114FF
156	Select Recommended Plan	1 day	Tue 7/16/02	Tue 7/16/02	155
157	**Draft GRR & EIS/EIR Completion & Processing**	**249 days**	**Wed 10/23/02**	**Mon 10/6/03**	
158	Preliminary GRR Draft	15 days	Wed 10/23/02	Tue 11/12/02	141,76,153,62,84,49,53,89,115
159	**Prepare AFB Document**	**20 days**	**Wed 11/13/02**	**Tue 12/10/02**	
160	Pre-confernce Documentation	5 days	Wed 11/13/02	Tue 11/19/02	158,85
161	ITRT Reviews AFB Doc.	5 days	Wed 11/20/02	Tue 11/26/02	160
162	Incorporate ITRT Comments	5 days	Wed 11/27/02	Tue 12/3/02	161
163	Finalize AFB Document & Repro.	5 days	Wed 12/4/02	Tue 12/10/02	162
164	SPD / HQUSACE Review of AFB Doc.	23 days	Wed 12/11/02	Fri 1/10/03	163
165	(F4) Alternative Formulation Tour & Briefing	2 days	Mon 1/13/03	Tue 1/14/03	164
166	Finalize AFB PGM	5 days	Wed 1/15/03	Tue 1/21/03	165
167	Update Draft GRR per AFB PGM	10 days	Wed 1/22/03	Tue 2/4/03	166
168	Team Review of Draft GRR	5 days	Wed 2/5/03	Tue 2/11/03	167
169	ITR Draft GRR	5 days	Wed 2/12/03	Tue 2/18/03	168
170	Incorporate ITR Comments	5 days	Wed 2/19/03	Tue 2/25/03	169
171	Finalize Draft GRR & EIS/EIR	10 days	Wed 3/5/03	Tue 3/18/03	170,126
172	NOA / NOC for Draft EIS/EIR (Prep/Mail/Process)	16 days	Wed 3/19/03	Wed 4/9/03	171
173	(F5) Public & HQUSACE 45 day Comment Period	33 days	Thu 4/10/03	Mon 5/26/03	172



ID	Task Name	Dur	Start	Finish	Predecessors
174	**Public Meeting / Hearing for Draft GRR-EIS/EIR**	**19 days**	**Thu 4/10/03**	**Tue 5/6/03**	
175	Meeting and Display Prep	18 days	Thu 4/10/03	Mon 5/5/03	173SS
176	Meeting Local Notices Mailed and Rcvd.	15 days	Tue 4/15/03	Mon 5/5/03	175SS+3 days
177	(F6) Public Meeting	1 day	Tue 5/6/03	Tue 5/6/03	176
178	Address Public and HQUSACE Comments	33 days	Wed 5/7/03	Fri 6/20/03	177
179	Prep for GRR review conference	5 days	Mon 6/23/03	Fri 6/27/03	178
180	(F7) GRR Review Conference	1 day	Mon 6/30/03	Mon 6/30/03	179
181	Comply with HQUSACE Conf. Directives	1 day	Tue 7/1/03	Tue 7/1/03	180
182	Coord / Prep / ITR Final GRR/EIS/EIR	66 days	Wed 7/2/03	Wed 10/1/03	181,105
183	Repro 25 Copies of Documents	3 days	Thu 10/2/03	Mon 10/6/03	182
184	**Final GRR & EIS/EIR Processing**	**66 days**	**Tue 10/7/03**	**Tue 1/6/04**	
185	(F8) GRR W/ NEPA Review by SPD	6 days	Tue 10/7/03	Tue 10/14/03	183
186	GRR W/ NEPA Compliance Review by HQUSACE	12 days	Wed 10/15/03	Thu 10/30/03	185
187	EIR Processeing	18 days	Tue 10/7/03	Thu 10/30/03	183
188	SPK Engr Letter Releasing GRR to Public	1 day	Fri 10/31/03	Fri 10/31/03	187
189	Repro 225 Copies of Documents	4 days	Mon 11/3/03	Thu 11/6/03	188
190	Final Public Review GRR & EIS/EIR	22 days	Fri 11/7/03	Mon 12/8/03	189
191	**Record of Decision (ROD) Processing**	**17 days**	**Fri 10/31/03**	**Mon 11/24/03**	
192	Draft ROD	5 days	Fri 10/31/03	Thu 11/6/03	186
193	HQUSACE Review of ROD	10 days	Fri 11/7/03	Thu 11/20/03	192
194	Modify Draft per HQ	2 days	Fri 11/21/03	Mon 11/24/03	193
195	Address Public Comments	10 days	Tue 12/9/03	Mon 12/22/03	190
196	**EIS Filing with EPA**	**12 days**	**Mon 11/3/03**	**Tue 11/18/03**	
197	Copy SPK Ltr w/ 5 copies EIS to EPA	1 day	Mon 11/3/03	Mon 11/3/03	188,122
198	EPA review of EIS	10 days	Tue 11/4/03	Mon 11/17/03	197
199	EPA Places Notice in Federal Register	1 day	Tue 11/18/03	Tue 11/18/03	198
200	Sect 401 State Water Quality Cert	21 days	Tue 10/7/03	Tue 11/4/03	106,187SS
201	Final ROD/GRR/401 Cert to HQ for Signature	10 days	Tue 12/23/03	Mon 1/5/04	199,200,195,194
202	ROD Signed	1 day	Tue 1/6/04	Tue 1/6/04	201
203	PCA Processing and Signatures	44 days	Wed 1/7/04	Mon 3/8/04	202
204	Project Management	825 days	Mon 1/22/01	Mon 3/22/04	
205	Contract Management	825 days	Mon 1/22/01	Mon 3/22/04	



APPENDIX D

OUTLINE FOR GENERAL REEVALUATION REPORT/ENVIRONMENTATAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

VOLUME 1

COVER SHEET/ABSTRACT*

SUMMARY*
- S.1. INTRODUCTION *(summary of background, authorization, purpose and need of the project, project area, history, etc.)*
- S.2. MAJOR CONCLUSIONS
  - *S.2.1.* Description of Proposed Action *(describe the preferred alternative, the potential effects of the preferred alternative*
    - S.2.1.1. Mitigation Measures
    - S.2.1.2. Identification of Significant Effects
  - *S.2.2.* Rationale for Selection of Proposed Action
  - S.2.3. Environmentally Preferred Alternative
- S.3. ISSUES OF KNOWN CONTROVERSY
- S.4. UNRESOLVED ISSUES
- S.5. STATE AND FEDERAL PERMITS, ENTITLEMENTS, AND CONSULTATIONS NECESSARY TO IMPLEMENT THE PROPOSED ACTION.

CHAPTER 1. INTRODUCTION
- 1.1. BACKGROUND
  - 1.1.1. Authorization
  - 1.1.2. Description of Authorized Project
  - 1.1.3. Status of Authorized Project
- 1.2. PURPOSE AND NEED FOR PROJECT MODIFICATION
  - 1.2.1. Study Area *(where)*
  - 1.2.2. Objectives *(why)*
- 1.3. SCOPE AND INTENT OF DOCUMENT *(Explains the purpose of document, the use of the document by the decision maker)*
- 1.4. ISSUES OF KNOWN CONTROVERSY
- 1.5. CONSULTATION AND OTHER REQUIREMENTS
  - 1.5.1. Endangered Species Act
  - 1.5.2. Fish and Wildlife Coordination Act
  - 1.5.3. Clean Water Act
  - 1.5.4. Clean Air Act
  - 1.5.5. Fish and Wildlife Coordination Act
  - 1.5.6. National Historic Preservation Act
  - 1.5.7. Executive Order 11988 – Floodplain Management
  - 1.5.8. Executive Order 11900 – Protection of Wetlands
  - 1.5.9. Executive Order 12898 – Environmental Justice
  - 1.5.10. California Fish and Game Code *(streambed alt permit)*
  - 1.5.11. Caltrans Encroachment Permit

- 1.6. OTHER PERTINENT STUDIES, REPORTS, AND PROJECTS
- 1.7. REPORT ORGANIZATION

CHAPTER 2. DEVELOPMENT AND EVALUATION OF ALTERNATIVES*

- 2.1. EVALUATION RATIONALE AND SELECTION PROCESS
- 2.2. PRELIMINARY SCREENING (ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED STUDY)

- 2.3. PRELIMINARY ALTERNATIVE SELECTION AND RATIONALE.

CHAPTER 3. ALTERNATIVES INCLUDING THE PROPOSED ACTION

- 3.1. NO-ACTION ALTERNATIVE
  - 3.1.1. Definition *(define what is meant by no action))(likely future conditions and management activities in the study area in the absence of the proposed action)*
  - 3.1.2. Continued SCVWD Operation and Maintenance

- 3.2. ALTERNATIVE 1 (PROPOSED ACTION)
- 3.3. ALTERNATIVE 2
- 3.4. ALTERNATIVE 3
- 3.5. IDENTIFICATION OF THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

CHAPTER 4. AFFECTED ENVIRONMENT*

- 4.1. HYDROLOGY AND HYDRAULIC CONDITIONS
  - 4.1.1. Hydrology
  - 4.1.2. Hydraulics
- 4.2. SOILS AND RIVER GEOMORPHOLOGY
  - 4.2.1. Sediment Load and Channel Erosion
  - 4.2.2. River Bed and Bank Conditions
  - 4.2.3. River Geomorphology
- 4.3. WATER QUALITY
  - 4.3.1. Temperature and Dissolved Oxygen
  - 4.3.2. Toxic Constituents
- 4.4. BIOLOGICAL RESOURCES
  - 4.4.1. Vegetation
  - 4.4.2. Fish
  - 4.4.3. Wildlife
  - 4.4.4. Threatened and Endangered Species
  - 4.4.5. Aquatic Habitat
- 4.5. LAND USE AND PLANNING
  - 4.5.1. Land Use
  - 4.5.2. Plans and Policies
- 4.6. RECREATION, PUBLIC ACCESS AND VISUAL RESOURCES
  - 4.6.1. Recreation and Public Access
  - 4.6.2. Visual Resources
  - 4.6.3. Plans and Policies
- 4.7. TRANSPORTATION AND TRAFFIC
  - 4.7.1. Existing Roads and Bridges
  - 4.7.2. Parking

- 4.8. AIR QUALITY, NOISE AND LIGHT
  - 4.8.1. Topography and Meteorology
  - 4.8.2. Federal and State Ambient Air Quality Standards
  - 4.8.3. Existing Air Quality Conditions
  - 4.8.4. Noise Regulations
  - 4.8.5. Existing Noise-Sensitive Land Uses
  - 4.8.6. Light Regulations and Zoning
- 4.9. HAZARDS AND HAZARDOUS MATERIALS
  - 4.9.1. Regulations
  - 4.9.2. Known Sites
- 4.10. CULTURAL RESOURCES
  - 4.10.1. Archeology and History
  - 4.10.2. Previous Cultural Resources Investigations and Known Cultural Resources
  - 4.10.3. Cultural Resource Management Responsibilities
- 4.11. HUMAN ENVIRONMENT
  - 4.11.1. Agricultural Resource
  - 4.11.2. Mineral Resources
  - 4.11.3. Population, Socioeconomics and Housing Resources
  - 4.11.4. Public Services and Utilities
  - 4.11.5. Environmental Justice

CHAPTER 5. ENVIRONMENTAL CONSEQUENCES*

- 5.1. HYDROLOGY AND HYDRAULIC CONDITIONS
  - 5.1.1. Criteria for Determining Significance of Impacts
  - 5.1.2. Hydrology Analysis
    - 5.1.2.a. No Action Alternative *(future without-project conditions)*
    - 5.1.2.b. Alternative 1
    - 5.1.2.c. Alternative 2
    - 5.1.2.d. Alternative 3
  - 5.1.3. Hydraulics Analysis
    - 5.1.3.a. No Action Alternative (future without-project conditions)
    - 5.1.3.b. Alternative 1
    - 5.1.3.c. Alternative 2
    - 5.1.3.d. Alternative 3
- 5.2. SOILS AND RIVER GEOMORPHOLOGY
  - 5.2.1. Criteria for Determining Significance of Impacts
  - 5.2.2. No-Action Alternative *(future without-project conditions)*
  - 5.2.3. Other Alternatives
- 5.3. WATER QUALITY
  - 5.3.1. Criteria for Determining Significance of Impacts
  - 5.3.2. No-Action Alternative *(future without-project conditions)*
  - 5.3.3. Other Alternatives
- 5.4. BIOLOGICAL RESOURCES
  - 5.4.1. Criteria for Determining Significance of Impacts
  - 5.4.2. No-Action Alternative *(future without-project conditions)*
  - 5.4.3. Other Alternatives
- 5.5. LAND USE AND PLANNING
  - 5.5.1. Criteria for Determining Significance of Impacts
  - 5.5.2. No-Action Alternative *(future without-project conditions)*

5.5.3. Other Alternatives
5.6. RECREATION, PUBLIC ACCESS AND VISUAL RESOURCES
5.6.1. Criteria for Determining Significance of Impacts
5.6.2. No-Action Alternative *(future without-project conditions)*
5.6.3. Other Alternatives
5.7. TRANSPORTATION AND TRAFFIC
5.7.1. Criteria for Determining Significance of Impacts
5.7.2. No-Action Alternative *(future without-project conditions)*
5.7.3. Other Alternatives
5.8. AIR QUALITY
5.8.1. Criteria for Determining Significance of Impacts
5.8.2. No-Action Alternative *(future without-project conditions)*
5.8.3. Other Alternatives. *(needs statement of conformity with Air Quality Act)*
5.9. NOISE
5.9.1. Criteria for Determining Significance of Impacts
5.9.2. No-Action Alternative *(future without-project conditions)*)
5.9.3. Other Alternatives
5.10. HAZARDS AND HAZARDOUS MATERIALS
5.10.1. Criteria for Determining Significance of Impacts
5.10.2. No-Action Alternative *(future without-project conditions)*
5.10.3. Other Alternatives
5.11. CULTURAL RESOURCES
5.11.1. Criteria for Determining Significance of Impacts
5.11.2. No-Action Alternative *(future without-project conditions)*
5.11.3. Other Alternatives
5.12. HUMAN ENVIRONMENT
5.12.1. Agricultural Resources
5.12.2. Mineral Resources
5.12.3. Population, Socioeconomics and Housing Resources
5.12.4. Public Services and Utilities
5.12.5. Environmental Justice
5.13. SUMMARY OF ENVIRONMENTAL EFFECTS AND MITIGATION

CHAPTER 6. CUMULATIVE EFFECTS AND OTHER REQUIRED ANALYSIS*
6.1. CUMULATIVE IMPACTS
6.1.1. Projects Included in the Cumulative Impact Analysis
6.1.1.a. Related Projects in the Berryessa Creek and Coyote Creek Watersheds
6.1.2. Cumulative Impacts and Mitigation Measures of Each Alternative
6.1.2.a. No-Action Alternative
6.1.2.b. Other Alternatives
6.2. THE PROPOSED ALTERNATIVE'S RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE OF LONG-TERM PRODUCTIVITY
6.3. IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES ASSOCIATED WITH THE PROPOSED ALTERNATIVE
6.4. GROWTH INDUCING EFFECTS OF THE PROPOSED ALTERNATIVE**

CHAPTER 7. COORDINATION AND CONSULTATION*
7.1. PUBLIC INVOLVEMENT

- 7.2. FEDERAL, STATE, AND LOCAL AGENCY INVOLVEMENT

CHAPTER 8. IDENTIFICATION OF THE RECOMMENDED PLAN
- 8.1. SELECTION CRITERIA AND RATIONALE
  - 8.1.1. Compliance with NED Objective
  - 8.1.2. Identification of Current Problems and Opportunities
  - 8.1.3. Constraints
    - 8.1.3.a. Physical
    - 8.1.3.b. Design*)*
    - 8.1.3.c. Construction
- 8.2. ELEMENTS OF PROPOSED PLAN
  - 8.2.1. Flood Damage Reduction *(summarize benefit analysis; detail in appendix)*
  - 8.2.2. Recreation *(summarize benefits, betterments; detail in appendix)*
  - 8.2.3. Environmental *(summarize)*
  - 8.2.4. Benefits *($$ 100-year level of protection, recreation, environmental)*
  - 8.2.5. Costs *(incl. cost apportionment and LERRDS)*
    - 8.2.5.a. Real Estate Considerations *(summarize - detail in appendix)*
  - 8.2.6. Incremental Cost Analysis *(summarize here, detail in appendix)*
  - 8.2.7. Summary Of Economic, Environmental, and Other Social Effects *(summarize here, detail in appendix)*
- 8.3. IMPLEMENTATION REQUIREMENTS
  - 8.3.1. Schedule *(budget and construction)*
  - 8.3.2. Institutional Requirements *(Report Approvals) (summarize here, detail in appendix)*
  - 8.3.3. Local Cooperation Requirements *(summarize here, detail in appendix)*
  - 8.3.4. Non-Federal Partners' Responsibilities
  - 8.3.5. Financial Capability *(summary statement)*
  - 8.3.6. Local Partners' Financing Plans *(summary here; details in appendix + letter)*
- 8.4. RECOMMENDATION*(for signature by DE)*

CHAPTER 9. DOCUMENT RECIPIENTS

CHAPTER 10. LIST OF PREPARES

CHAPTER 11. REFERENCES
- 11.1. PRINTED REFERENCES
- 11.2. PERSONAL COMMUNICATIONS

INDEX

TABLES

FIGURES

LIST OF APPENDICES

APPENDIX 1. Environmental Appendix
APPENDIX 2. POST-AUTHORIZATION CHANGE REPORT SUMMARY
APPENDIX 3. PERTINENT CORRESPONDENCE

APPENDIX 4. MITIGATION AND MONITORING PLAN

GLOSSARY

LIST OF ACRONYMS AND ABBREVIATIONS

VOLUME 2

APPENDIX 5. ENGINEERING APPENDIX
  - 5A. INTRODUCTION
  - 5B. PLAN ALTERNATIVES
  - 5C. HYDROLOGY AND HYDRAULIC DESIGN
  - 5D. STRUCTURAL DESIGN
  - 5E. SURVEYING AND MAPPING
  - 5F. GEOLOGY
  - 5G. GEOTECHNICAL DESIGN
  - 5H. RELOCATIONS
  - 5I. SPECIAL CONSTRUCTION ISSUES
  - 5J. OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION (OMRR&R)
  - 5K. COST ESTIMATES (MCACES)
  - 5L. DESIGN AND CONSTRUCTION SCHEDULE

  PLATES
    1. VICINITY AND GENERAL MAPS
    2. PROJECT PLAN
    3. PLAN AND PROFILE
    4. PLAN AND PROFILE
    5. PLAN AND PROFILE
    6. TYPICAL SECTIONS
    7. TYPICAL DETAILS
    8. PROJECT HYDROLOGY
    9. 1% CHANCE FLOOD HYDROGRAPHS
    10. STANDARD PROJECT FLOOD HYDROGRAPHS
    11. STRUCTURAL LOADING CONDITIONS
    12. PROJECT GEOLOGY MAP
    13. LOCATIONS OF EXPLORATIONS
    14. LOGS OF EXPLORATION
    15. SUMMARY OF TEST RESULTS

APPENDIX 6. REAL ESTATE PLAN
APPENDIX 7. ECONOMICS REPORT
APPENDIX 8. RECREATION PLAN

APPENDIX E

CONTRACTOR QUALITY CONTROL PLAN

Approval Letters will be provided upon completion of comments to the A-E Contractors Quality Control Plans

Planning and Environmental Contract: Tetra Tech, Inc.

QUALITY CONTROL PLAN

INTRODUCTION

To assure the high quality of products delivered under Contract DACW for the Berryessa Creek Project, Santa Clara County, California Planning and Environmental Work to the Sacramento District of the U.S. Army Corps of Engineers, Tetra Tech, Inc. (Tt) will employ a formal quality control process meeting procedures established by the Corps.

Purpose of Technical Review. The technical review portions of the quality-control reviews will focus on compliance with established policy, principles, and procedures, using clearly justified assumptions. The reviews will include verification of assumptions, methods, procedures, and material used in analyses, based on the level of complexity of the analyses and safety risks posed by the project. The reviews will verify the alternatives evaluated, appropriateness of data used and level of data obtained, functionality of the product, and reasonableness of the results.

Tt's Review Team. Tt's ITRT team is composed of senior staff having expertise in the disciplines utilized on the project team. Review team members each have over 10 years experience in the profession and have multidisciplinary expertise. While serving in the review-team capacity for this project, they will not be involved in development of the project or in supervision of project-team members. A review-team leader was chosen based on broadest, greatest experience relevant to the subject areas of the project.

Quality Control Plan Elements. To guide the quality control/technical review process, this project-specific quality control plan (QCP) has been prepared and is subject to review and approval by the Corps.

The various QC/TR guidance documents noted previously establish several different requirements for QCPs, all of which are described below:

- the QCP objective: to ensure that all project tasks meet project purposes and requirements of appropriate laws, regulations, policies, and technical criteria, on schedule, and within budget.

- applicable guidelines for review:

  - all applicable Federal, state, and local environmental laws and implementing regulations, including the Federal and State endangered species acts and a variety of other environmental law, and other Corps guidance,

- provision of information in an acceptable form such that the information may be effectively and efficiently used by the Corps,

  - objectives outlined in ER 1105-2-100, Planning Guidance; and ER 200-2-2, Procedures for Implementing NEPA, and

  - objectives outlined in ER 1110-1-12, Engineering and Design Quality Management.

- documents or other products to be reviewed by the Tetra Tech team, including (but not limited to) biological data reports, mitigation and monitoring plan, impact/benefits analysis, mitigation incremental cost analysis, and draft and final EIS/EIR.

- milestone list and schedule for review activities to assure seamless review: the Tetra Tech team will review the project team's approach to preparation of each deliverable at the outset of work on the deliverable, and all reviews of draft deliverables will occur 1-3 days prior to deliverable due dates. Review comments will have be accommodated in each product prior to delivery to the Corps.

- unique, sensitive, or high visibility items requiring special attention: Tt will give special attention to the review of products intended to provide statutory compliance with the ESA and other resource-protection and agency-coordination laws.

- methods to resolve significant technical issues: if Tt's project manager cannot resolve a significant technical issue, he will bring it to the attention of the Corps' Environmental Resources Branch Representative for resolution.

- lessons-learned process to be used: compilation and application of a lessons-learned list is more applicable to a design project, which is not a part of this environmental documentation project. However, our project manager and Tetra Tech staff have considerable experience with environmental documentation of impacts of flood control projects and other types of projects affecting the Guadalupe River system. Their primary responsibility will be to continuously apply the lessons they have learned in the past to situations that arise during work under this contract.

- any proposed deviations from the Division's quality management plan: none are proposed.

- review documentation: all reviews will be documented in the form of memoranda. Each memorandum will include review comments from all team members as coordinated by the team leader, as well as the response to each comment formulated by the project manager. A separate memorandum will accompany each of the deliverables noted above. Comments and responses will be arranged by discipline.

Quality-Control Process. The Tetra Tech staff will review not only project documents but will review early project assumptions and proposed assessment methodologies and provide means of improvement where needed. In later stages of projects, the Tetra Tech staff will examine Corps' and other agency comments on draft deliverables and the project team's proposed disposition of those comments. If a lack of responsiveness is apparent to the QC reviewers, steps will be taken to provide an adequate response and modify the project as warranted.

For each area of concern identified by the Corps', the Tetra Tech staff will describe in writing: a) the concern, b) the basis of each concern, c) the significance of the concern, and d) the specific actions needed to resolve the concern. The project team will resolves the concern or, if substantial difficulties attend resolution, refer the matter to the Corps' project manager for resolution as previously described.

APPENDIX F

CONTRACTOR SCOPES OF WORK

1. PLANNING and ENVIRONMENTAL
2. ENGINEERING

(SOWs will be available upon approval).